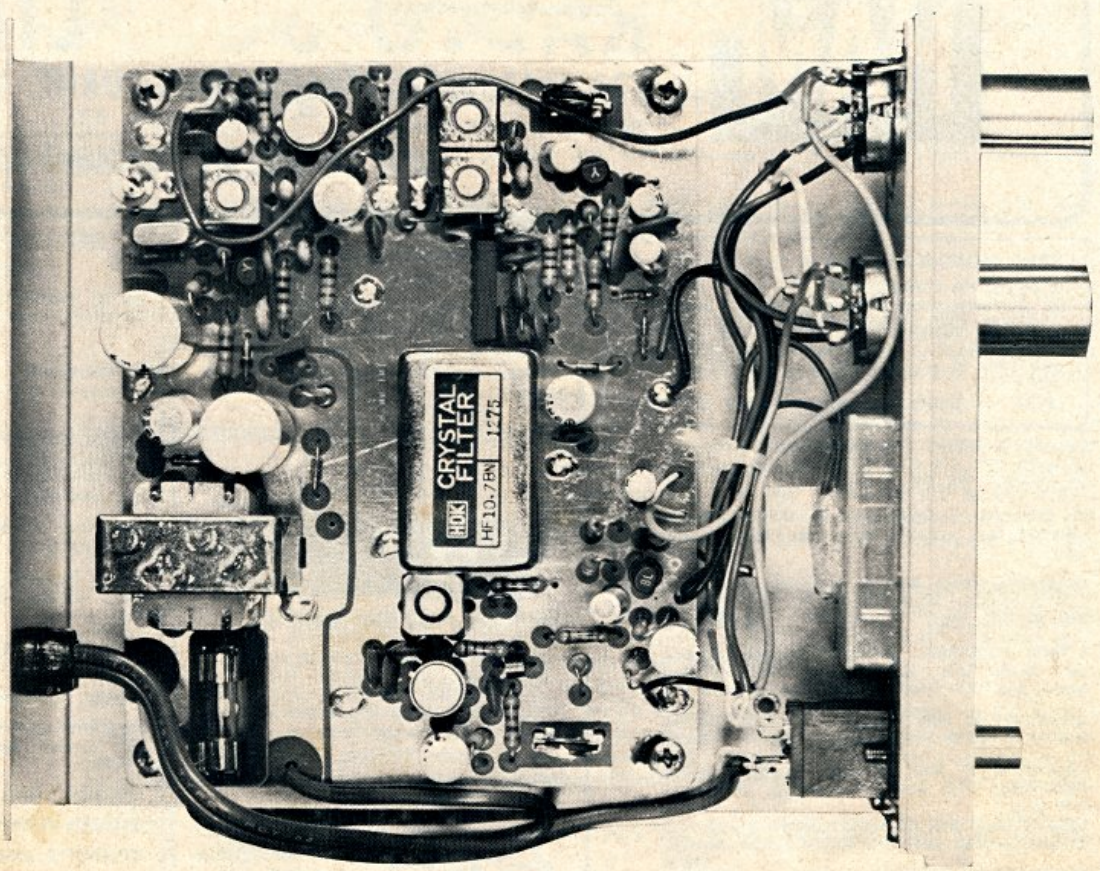
amateur radio



VOL. 44, No. 2 FEBRUARY 1976

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A top view of the KP12A RF Speech Processor with the cover removed. See review on page 18 of this issue.

Photo: Ken Reynolds VK3YCY

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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22 Channels, fitted with Ch. 1 and 4 repeaters. Technical Data: Transmit 10 and 1 watt positions. Max. freq. deviation +15 kHz. Spurious response —60dB. Receiver less than 1W for 30 dB SW selectivity. 20 kHz at 60 dB down; 40 kHz at 70 dB down.

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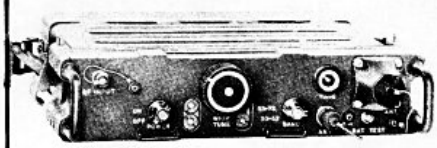

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3" "N" type connectors to suit above. **$5**

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amateur radio

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QSP CHRONICLES AND REVELATIONS

It so happened the other day my eye fell upon words of wisdom from across the decades.

This is an extract of what H. K. Love, 3BM, wrote as an editorial in the 15th June 1924 issue of the Radio Experimenter —

"Achievements in long distance transmission and reception of the greatest value are being accomplished almost daily, and it has now become of the greatest importance that these results should be scrutinised and chronicled by some interested body in order that the credit may be held by the right party . . . . we would suggest that the Wireless Institute of Australia, which is the organisation fully representative of Australian experimenters, proceed with the organisation of such scheme without delay . . . .

Whilst it is obvious that the requirements of communication on a commercial basis are widely different from those affecting amateur work it must be admitted that the amateur experimenter has been a decided factor in the rapid progress of this science. It is an acknowledged fact that amateurs are almost solely responsible for the development of apparatus suitable for communication on the short waves which in the early days were assigned to the amateurs more or less to keep them out of mischief.

This however, has proved to be the amateur's salvation, since the necessity of concentration on investigation into the peculiarities of these waves has resulted in the development of apparatus eminently suitable for the work and capable of producing the most astounding results.

Now that the world of commercial wireless has been awakened to the possibilities of these wavelengths, the experimenter should exert himself to the utmost to retain hold over his position, and should, indeed, also strive after the use of even shorter waves in the region of 50 metres, which would necessitate the development of entirely new methods, pioneering work which would be contributing something new to the science."

This was written in 1924 — nearly 52 years ago — and is as apt today if 50 cm were substituted for 50m.

Are amateurs today merely becoming another consumer of communications equipment rather than "setting the pace" as was the case during the first two or three decades of this century?

Yes, there are still some fields today in which amateurs can be regarded as pioneering. Free access Oscar Satellites is a good example. Others are EME and Meteor Scatter work. TEP on 6m some years ago created considerable interest in certain professional fields.

To a lesser degree high stability, narrow band transmissions in the amateur bands from 23 cm to 3 cm and ATV in the 70 cm and 23cm bands can also be considered as pioneering work.

The past 10 years has seen many changes and advances in the operating habits of VHF/UHF exponents in Australia. Upgrading of equipment and techniques in the tunable segments of our bands and the almost general acceptance of SSB for 'phone work (where did all those 522s go?) are examples along with the establishment of FM net operations with the aid of repeaters to populate the 2m band. And the 70 cm band is 'just around the corner' too.

Nevertheless one thing is painfully obvious. The number of experimenters appears sadly to be on the decrease if a perusal is made of Australian VHF/UHF/SHF records. No new records have been claimed in some States for 5 to 10 years. The 2300 MHz record took 23 years to break — 1950 to 1973.

Many reasons can be found for this decline in experimentation but where are we heading?

It is known that small groups of amateurs are active throughout Australia experimenting with various modes on exotic or not-so-exotic frequencies. Some records could easily have been broken but pass undocumented and unchronicled in AR or in the WIA's register of Distance Records.

This register is held by myself as Chairman of the VHF/UHF Advisory Committee. Please — if you aim to break a record, send me the full details of the results.

Oh, and by the way, don't forget about the amateur bands — USE THEM OR LOSE THEM.

P. A. WOLFENDEN VK3ZPA
Member of the Executive. ■

WIANEWS

At the time of writing this in late December there is still a lack of news about examinations.

A letter was written on behalf of the Institute in mid-December to the Secretary of the PMG's Dept. expressing dissatisfaction that measures to alleviate the problem appear to be having little if any effect.

It was pointed out that 1975 was an extremely poor year for amateur exams. Either the results of the only exam which was held were not notified within a reasonable time, or the others were cancelled.

It was also pointed out that the Institute had already made one suggestion for assisting with the holding of the simpler exam but no response had been forthcoming. Offers of further assistance and advice were made. The R. & L. Branch know as well as we do that in some parts of the world amateur examinations are set and conducted by education authorities — e.g. City and Guilds of London — on which the amateur service is represented on the examination board. They also know, as we do, that in other places exams are conducted by the amateurs themselves — on a selective basis — and even in some cases are also set by amateurs in accordance with stipulated parameters.

Needless to say the Department was reminded that if there exists a statutory requirement for examinations — and there is such a requirement for anyone aspiring to secure an amateur licence — then it is encumbent upon the Government to see that the required examinations are duly set and conducted. A comment on the side could be made that if Government demands the possession of a driving licence before a person may drive a car then it would be wrong if the Government failed to hold the necessary examination — a near enough parallel case. It is extremely bad administration to make a law which nobody can possibly comply with.

Which leads to the last point made in the letter, namely that every encouragement should have been given to those aspiring to take the Novice Exam. Instead of which the exam was cancelled for the first and second times. This has resulted, it is believed, in much loss of faith on the part of those illegal operators who wanted to 'go legit' as the saying goes. Consequently this may well result in additional problems to the administration caused by a probable multiplication in the numbers of 'pirates'.

It is now evident that if the cut-backs in Government spending will be applied to the R. & L. Branch in addition to all other Departments the general situation may reflect a further deterioration not only in the examinations area but also in licensing and other matters.

At this point in time the future does not appear very encouraging unless there is a marked change of attitude in the official sphere. This serves to explain the hardening of Executive's approach to these problems.

Another letter was sent off to the Secretary of the PMGs Dept. in mid-December asking about progress on the 1976 Call Book print, reduced licence fees for pensioners and disabled persons, and the position about the administration's follow-up on intruder reports.

The R. & L. Branch refers back to the contract made in 1970 between the PMGs Dept. and the Institute which was to be in force for 6 years during which time 3 call books were to be issued at two yearly intervals. The 3 call books were duly printed in 1971, 1973 and 1975. The contract expires 31-12-1976. The Institute has submitted that the 1976 call book would be in the nature of an experimental issue using computer information deriving from WIA membership records on the one hand and PMG listings in respect of non-members. This is another question which cannot go unanswered if a 1976 call book is to appear at all. In fact it is already very late to plan such a book.

Yet another letter in mid-December to the Secretary of the PMG's Dept. replied to their letter of 20th October advising that WARC would be held in the second half of 1979 for a duration of about 10 weeks and stating that studies are now beginning so as to formulate the Australian requirements and attitude prior to compiling an Australian Brief for the work of the Conference. It was anticipated that a Preparatory Group will be formed in due course for these purposes.

The Executive's reply was on the lines already briefly set out in WIANEWS for Dec. 1975 AR and containing the general motions passed at the 1975 Federal Convention as reported on p.26 of AR June '75.

Yet another letter to the R. & L. Branch late in December gave them the details of the WIA 70 cm band plan relating to the 430-440 MHz portion of the band and seeking approval for this with the riders that repeater channels still remain to be finalised and there could be some minor modifications at a later date.

A further letter to the R. & L. Branch is almost finalised relating to repeater conditions. Three specific variations are under consideration. These are that idents for repeaters should not be compulsory since users must identify themselves, that the compulsory submission of circuit diagrams is as archaic as the amateur service itself, and that individual State offices must not impose unilateral conditions without prior approval by Central Office.

A further bone of contention to be taken up is the alleged long delays in obtaining repeater licences.

WIANEWS in Dec. '75 AR quoted extracts from the Novice Licensing Investigation Committee's Report submitted to Federal Council early in April 1971 in which limited tenure was strongly recommended. Since this was a definite 21 page Report there seemed little object in mentioning the supplementary Report submitted by that Committee on 31st Oct. 1971 which reversed that recommendation amongst other modifications. Both Reports were of course carefully considered by the Federal Council in arriving at the ultimate decision at the 1972 Federal Convention.

Four postal votes were circulated by the Executive late in 1975. The first one sought the ratification of Mr. J. Flynn as Federal YRCS Secretary. This was approved. The second one contained the WIA 70 cm band plan and this likewise was adopted by majority vote, VK4 being the only Division to vote in the negative (detailed comments were stated to be under preparation but have not been received) although VK2 wanted certain 'minor' modifications which it was agreed could be brought up for discussion by Agenda Item at the next Federal Convention.

The third postal vote related to a 'gentleman's agreement' band plan for Novice Licensees and this was adopted without dissent. The CW only portions of their band segments will be 3525-3535 kHz, 21125-21150 kHz and 26960-27030 kHz. This leaves the following for telephony and CW:— 3535-3575 kHz, 21150-21[illegible] kHz and 27030-27230 kHz. Prospective Novice Licensees (when this licence comes to fruition) are asked to note these segments very carefully and abide by them.

The fourth postal vote was the postponement of the 1976 Federal Convention by one week — i.e. that it now be held from 7th to 9th May 1976 in Melbourne. The outcome is unknown at the time of writing but a 'straw' vote taken beforehand indicated no opposition.

If you have any Agenda Items to put up for this Convention knock them into proper shape and send them to your Division right away.

At the last Executive Meeting of the year the Federal President reported on his visit to Launceston and Hobart early in December. The proposed WIA Satellite Award for which the necessary paper work was nearly complete was put on ice for the next Convention in view of the new Satellite Award reported on p.48 of Dec. '75 AR. The interesting Public Broadcasting Report of October 1975 made by a Working Group to the Minister of the Media was noted with some approbation relative to amateur radio interests. Also noted, with great appreciation, was the work being done by Brig. Rex Roseblade, VK1QJ, the Federal WICEN Co-ordinator. He also attended the deferred hearing of IAC on 1st December relating to the electronics industry and it appeared that little if anything transpired to upset the customs by-law proposals already reported on pages 3 and 4 of Nov. '75 AR.

The State visit of JY1, King Hussein of Jordan, to Australia has not escaped the notice of Executive. Contact with the appropriate authorities is under way.

And lastly the Executive accepted with regret the resignation of Mr. Russell Kelly VK3NT, caused by possible clash of interests, and expressed appreciation for his work on Executive. ■

WHAT IS THE WIRELESS INSTITUTE OF AUSTRALIA - PART 2

We have seen from Part 1 that there are 8 WIA's, namely, 7 autonomous self-governing and independent Divisions (one in each State — VK8 comes under VK5) and an entirely separate Federal WIA supported by and belonging to the Divisions as a whole.

We have seen that the Federal WIA is allowed to do those central functions for Australian amateur radio which no one Division could do without wearing two hats. An agreement exists as well as a Constitution.

We have seen that the 7 Divisions are the members' (with equality of voting) of the Federal WIA. There are no other 'members' of the Federal WIA. You, as a member, are a member of a Division — the Division which has control in the State or Territory in which you reside (usually).

If you have read and understood these facts you will see that it is not much use writing direct to the Federal WIA with the object of changing an existing Federal policy on the books from Conventions and Federal Postal Voting. You must write to your Division about this kind of thing — by all means copy it to the Executive Office if you wish.

The Divisions originate Agenda Items and other business to be debated at Conventions. Executive also can and does originate Agenda Items (etc.) as well as conducting postal polls as required.

There is a great deal of information exchange between Federal Councillors and the Executive throughout the year. The WIA as a whole is very much a living entity and champion of the amateur radio cause through the very close and cordial relationships between the people within itself informing and guiding one another along the guide lines mutually agreed as being the most beneficial. The operative word is 'mutually' even though one Division or another might go off at a tangent on matters of internal policy.

Basically, whatever may be harmful or good to one Division is usually harmful or good for every other Division.

Under the terms of an agreement (29-6-1971) the Divisions acknowledge and agree that the Federal WIA shall have paramount powers to act as the representative of radio amateurs throughout Australia before or on governmental, political or technical bodies within or outside Australia in relation to matters directly or indirectly affecting amateur radio or radio amateurs in more than one Division.

The Federal WIA has also been given paramount powers in relation to a number of other matters which affect amateurs from more than one Division or have effect externally or affect two or more Divisions.

In so short an article as this it is quite impossible to spell out in detail all the Constitutional provisions but it is obvious that control is essential to prevent persons or Groups doing their own 'thing' independently of the WIA. The objectives are to foster and promote amateur radio in the best possible manner for the greatest possible benefit of all who enjoy it.

Hopefully this will help to explain the necessity for the continuation of the centralised functions of the WIA amongst which are representations and dealings with 'Central Office' of the Radio Frequency Management Branch and other Government Depts., etc., IARU matters, all relations with overseas amateur radio societies, Intruder Watch, Federal Contests and Awards, Project Australis, WIA YRCS and others.

The Divisions, as we have seen, look after amateur radio affairs within the respective States and Territories.

Each Divisional Council controls and manages a number of important local matters. Amongst these are dealings with the respective State Radio Branches on State affairs such as local repeaters, Amateur Advisory Committees (which are most important arbitrators, as it were, between the individual and the Radio Branch) and the acquisition and sale to members of disposals, components and equipment.

Many of the Divisions conduct their own classes and courses to prepare people for amateur examinations in theory, regulations and morse code. Some clubs also carry out these functions on their own account. Another local function is the QSL bureau both inwards and outwards for the benefit of members. This has assumed increasing importance as the postage rates go up.

Each Division conducts a broadcast at specified times to disseminate news and items of interest for country members and interested listeners. The broadcasts are usually done on Sunday mornings on most of the lower HF amateur bands as well as on VHF. Every Division issues a bulletin or news sheet (often times as an insert in AR) covering items of Divisional interest so as to free the pages of AR for technical articles and matters of general, as opposed to local, interest.

Yet another important function of Divisions (and indeed the radio clubs as well) is to provide a focus for numerous social activities, lectures, specialised groups, field events and so on. Indeed, the larger Divisions own or rent their own central premises and in two cases have an office manned by a paid clerical assistant.

The Divisions also provide certain other facilities devoted to the advancement and betterment of amateur radio for their members. One specific item worthy of mention is advice or assistance if an amateur encounters interference problems or difficulties in getting planning permission to erect masts and aerials.

Amateur radio is a truly world-wide activity enjoyed by almost a million people in their own homes, in their 'shacks' on remote islands, as amateur stations in their own cars, boats or caravans, aboard ships at sea and aircraft in flight, through amateur radio's own satellites in orbit and even on foot.

Amateurs represent a wide cross section of the public and are always ready to swing into action for emergencies and disasters. A truly magnificent leisure activity for young and old alike. ■

ASJA AWARD

The Publications Committee has pleasure in advising that the winner of the ASJA Award for 1975 is Mr. Bill Rice VK3ABP for his article "On Eyre" in the August issue.

CONVERTING THE FT401 TO 160 Mx AND 11 Mx

R. R. Cook VK3AFW
7 Dallas Ave., Oakleigh, 3166

This article will show owners of the popular FT400/401/560/570 series of transceivers how to make their rig even more versatile. Two simple but effective procedures are described to allow the FT401 to be used on 160 Mx and 11 Mx. The procedure for the FT401 can be used on similar Yaesu transceivers such as the FT400 and the FT570. The operation on the other five bands is unaffected and no holes need be drilled.

GENERAL REMARKS

Two sets of step by step instructions have been devised to allow even an inexperienced owner to easily and quickly convert his FT401. Before presenting these instructions, which are self-explanatory, a few general comments need to be made.

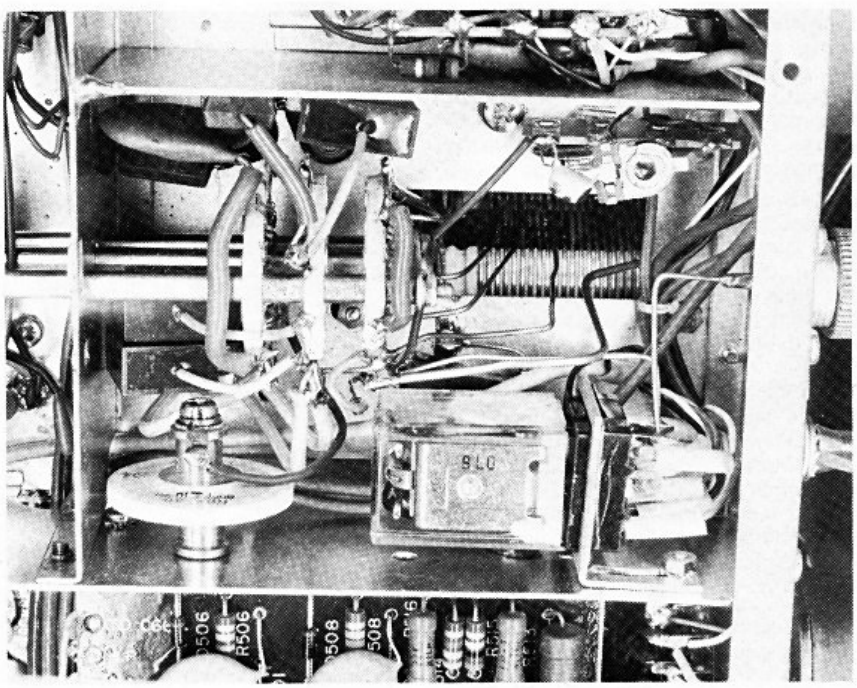
Firstly, the part numbers quoted apply to the author's FT DX 401. Owners of other models should check their circuit diagram before proceeding. Although it is possible to improve on the conversions described here, it is likely that few amateurs would be prepared to go to the trouble necessary for what may be considered marginal advantages. For example, only the smaller sections of the pre-selector tuning capacitor are used on 1.8 MHz and this allows only an 80 kHz coverage. In VK, however, this does not seem to be a problem worth worrying about as there is still adequate gain to copy ZL stations above 1.9 MHz.

The 11 Mx conversion requires only a crystal and a few short lengths of wire. A light duty soldering iron, a Philips head screw driver, and a pair of side cutters are the only tools required. This conversion represents a good starting point for anyone who is afraid that he may spoil his new transceiver. It will take you about an hour and you will find it easy to make a very neat job. Use insulated wire for the links and keep all wiring away from the chassis as some of the links carry quite high voltages.

The 160 Mx conversion may take three or four hours and requires the addition of three coils and seven capacitors as well as some wire and a crystal. Both crystals were obtained from Max Howden and the coil formers from Bail Electronic Services.

These formers should be obtained complete with slug and mounting clip. Alternatively, broadcast band coils could be used if of a suitable size and if they can be adjusted to resonate at 2 MHz with 220 pF across them. This will probably require stripping off a few turns. The coils described in the conversion can be made to resonate from 1.6 to 2 MHz by adjusting the slug.

It would be preferable to use close tolerance silver mica capacitors throughout. However, they may be difficult to buy now and, unless you are very lucky your junk box will not have all of the required values. Styroseal capacitors are recommended for the low level stages such as the RF amplifier, mixer and driver tuned circuits. The capacitors around the final loading circuit have to carry large circulating RF currents, and this should be kept in mind when choosing them. Under no circumstances use paper dielectric capacitors anywhere in the conversion. The 600 pF 1.5 kV ceramic capacitor was obtained from Bail Electronic Services. Suitable mica capacitors may still be available through disposal sources. Check all these capacitors before installation, however.



On 160 Mx the controls do not peak as sharply as on other bands. This is brought about by the bandspread effect associated with this conversion. The preselector covers only 80 kHz on 1.8 MHz compared to several hundred kHz on 3.5 MHz, thus more degrees of rotation are necessary to tune less kHz.

Although this may not apply to all units it was found necessary on the author's unit to shift the 80 Mx tank tap as described in step 13 of the 160 Mx conversion. It appears that the shorted section of the 160 Mx tank reduces the 80 Mx inductance slightly.

On the 11 Mx band the correct VFO scale is the black 0-500 one while on 160 Mx the red 500-1000 scale is the appropriate one.

PERFORMANCE

The on-the-air performance is excellent on 160 Mx and adequate on 11 Mx. No loss of performance on the other five bands occurs as a result of the conversions. Output power on 160 Mx was measured at 300 W PEP, the same as on 80 Mx. Noticeably lower input and output occurs on 11 Mx; however this does not seem to be of practical significance.

The reduced performance on 11 Mx is partly due to imperfect tracking of the ganged tuning capacitors over the range 27-30 MHz. If new coils were added for the receiver RF and mixer circuits and for the PA driver circuits, improvements in sensitivity and increased PA drive would result. However, for all but the most enthusiastic 11 Mx operator, the conversion described here should be adequate.

It is possible to increase the receiver and transmitter sensitivity on 160 Mx by increasing the value of the capacitor referred to in step 5, but unless the coils referred to in steps 7, 8 and 9 are shunted with resistors of about 20k ohms, the 'S' metre will give exaggerated readings and the carrier rejection figures will be degraded.

WARRANTY

Both conversions have been discussed with the Australian Agents for Yaesu. Although no major criticism was made of either conversion (some helpful suggestions were made regarding this article), it was pointed out that any modification to a set by anyone other than the agents would make the 90 day warranty void.

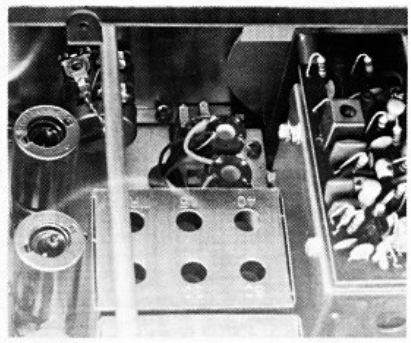
In the unlikely event of a constructor experiencing technical difficulties with either conversion, the author would be glad to correspond with him.

11 Mx CONVERSION

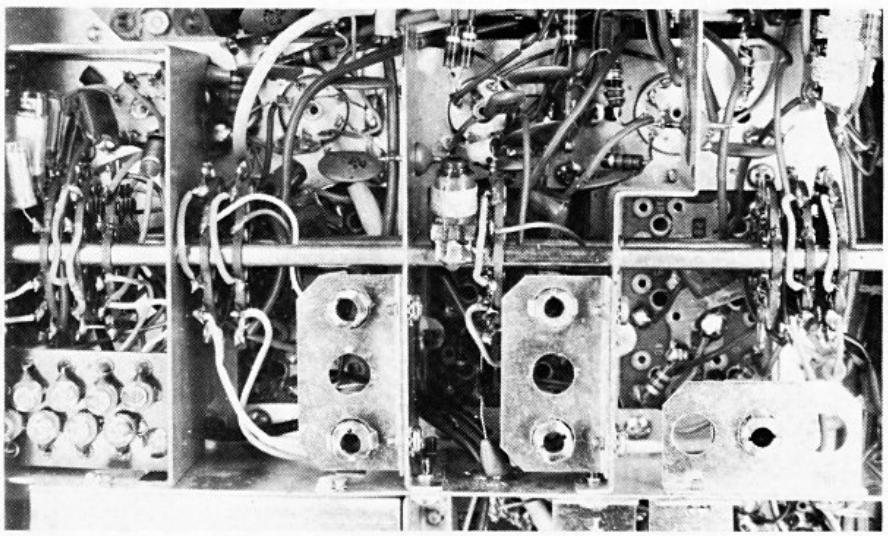
1. Remove top panel.
2. Turn transceiver upside down on a towel or blanket spread on the bench. Remove the bottom panel.
3. Check that the AUX 1 crystal socket is wired to switch wafers S1a and S1b. *(Note:* Switch S1 is the BAND switch. Wafter "a" Is nearest the front panel. Wafer "i" is not used and is located *in front* of wafer "h". That is, the positioning of the wafers from the front panel going towards the back is a, b, c, d, e, f, g, i, h, j, k, l, m).
4. Link AUX 1 contact to 10D contact on switch wafer S1c. This allows the 10 Mx crystal oscillator coil to be used for 11 Mx as well.
5. Wire in links from the AUX 1 contacts to the 10D contacts on switch wafers S1e, S1f, S1g, S1h, S1j and S1m. This connects the 10 Mx coils for the RF amp., mixer, driver and PA stages into circuit when the AUX 1 switch position is selected.
6. Turn transceiver up the right way and fit a 11.007 MHz crystal into the crystal socket (on the top of the chassis) furthest from the side panel. (V2 operates as an electron coupled tripler to 433.020 MHz. The equivalent shunt capacitance across the crystal is about 20 pF). A pair of tweezers may help as the crystal is a small type K and the sockets are placed close to the front panel.
7. Set BAND switch to AUX 1, connect a dummy load, switch the set on and allow 10 minutes warm up.
8. Set the LOADING control to 4 and the PLATE control between the 10 and 15 positions.
9. Turn up the audio gain, switch on the 25 kHz calibrator, and tune to the 27.125 MHz signal. Peak the preselector for maximum signal from the calibrator. Now peak using trimmer TC1108 (far left corner of pcb holding group of small trimmers under chassis near S1). This trimmer tunes the 33 MHz crystal oscillator plate circuit to resonance.
10. Switch to TUNE mode and advance MIC GAIN CARRIER control to obtain 100 mA plate current. Check that PRESELE control is at position that gives maximum current. Adjust PLATE and LOADING controls to obtain maximum output. Switch to receive. The conversion is now complete. Replace top and bottom panels. Connect a suitable antenna, trim all controls for optimum operation and start working those new stations.

160 Mx CONVERSION

1. Remove top panel.
2. Turn transceiver upside down on a towel or blanket spread on the bench. Remove the bottom panel.
3. Check that the AUX 2 crystal socket is wired to switch wafers S1a and S1b. (Refer to note in step 3 of 11 Mx conversion).
4. Wire a link from the AUX 2 contact to the JJY/WWV contact on wafer S1c. This allows the JJY/WWV crystal oscillator coil to be used for 160 Mx.
5. Add a 220 pF 600 V styroseal capacitor across TC1109. Solder one end to the earth tag near the tube socket and the other end to the AUX 2 contact on S1d.
6. Wind 3 new coils each of 55 turns using No. 42 SWG enamelled copper wire. (The gauge size is not critical and thicker wire could be used). Use nail polish to secure the windings. Leave 15 mm of space at the top of the former. Add a winding of 10 turns to the antenna coil. Wire a 220 pF 600 V styroseal capacitor across the main winding of each coil.



7. Remove the screws holding the coil bracket in the same compartment as switch wafers e and f. Relocate existing trap coil in left hand hole and mount new 160 Mx antenna coil in the right hand hole. Wire the common earth connection of the new coil to chassis (the large copper area of the pcb). Wire the antenna link to the AUX 2 contact of S1e and the top of the main winding to the AUX 2 contact of S1f. Replace bracket.
8. The new mixer coil is fitted into the next compartment in a similar manner. Solder one end to the AUX 2 contact of S1g and the other end to the + 180 V rail on the pcb. (Again this is the large copper area).
9. Fit the new driver plate coil into the compartment of wafer h. Connect one end to the AUX 2 contact of S1h and the other end to the + 300 V supply rail on the pcb.
10. Wire a 390 pF 600 V styroseal capacitor between the AUX 2 contact of S1j and the earth lug on the chassis. This is part of the 160 Mx PA neutralising circuit.
11. Solder a 600 pF 1.5 kV disc ceramic capacitor from the AUX 2 contact of S1k to ground. There is a self-tapping screw near the left front corner of the compartment which is well placed. Fit a tinned earthing lug under it for the 600 pF capacitor. You will need this earth point again later. This capacitor is in parallel with the PA tuning capacitor on 160 Mx.
12. Remove the antenna change over relay from its socket. Remove the 1000 pF capacitor (C86) which is wired to the 80 Mx contact on S1m. Connect a 500 pF 600 V mica or similar capacitor in parallel and connect the combination to AUX 2 contact of S1m. A single 1500 pF capacitor may be used if desired. This increases the loading capacitance of the PA pi network.



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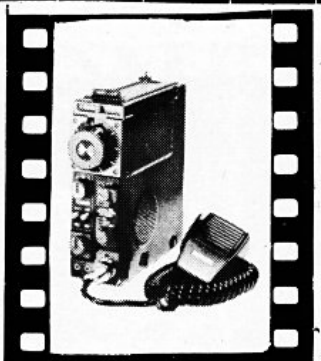


IC-202

ICOM

144MHz SSB CW 3W TRANSCEIVER

* Coverage 144-145MHz:
  144.0 – 144.2/144.2 – 144.4 (crystals provided)
  Provisions for other crystals (200KHz per xtal).
* VXO operation giving 200KHz with excellent stability.
* pep output 3 watts.
* cw output 3 watts.
* RIT tuning ± 3KHz
* noise blanker.
* receiver sensitivity 0.5 uV (S+N)/N 10dB
* receiver selectivity 1.2 KHz – 6dB
  2.4KHz – 60dB
* aduio output 1 watt
* battery external supply 13.8V @ 15%. Provision for internal dry cells or nicads.
* Size 183 x 61 x 162 mm.
* mass 2Kg.
* current drain max ssb 540ma Tx, 90ma av Rx.

$210

Complete with mic, manual, carry-strap, dry cells and the VICOM 12 month warranty.

IC-502

ICOM

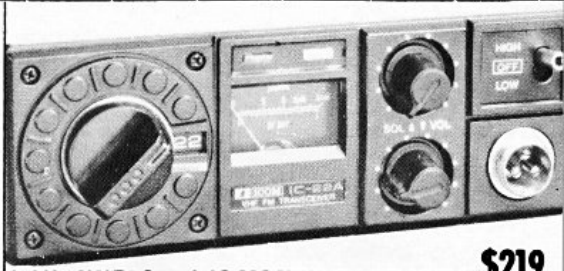
50MHz SSB CW 3W TRANSCEIVER

* Coverage 52-54 MHz
  VFO controlled
* pep output 3 watts
* cw output 3 watts
* RIT tuning
* noise blanker
* receiver sensitivity 0.5 uV (S+N)/N 10dB
* receiver selectivity 1.2 KHz – 6dB
  2.4 KHz – 60dB
* audio output 1 watt
* battery external supply 13.8V @ 15% Provision for internal dry cells
* size 183 x 61 x 162 mm
* mass 2.1 kg

$219

Complete with MIC, carry-strap, dry cells and the VICOM 12 month warranty.

NEW ICOM QUALITY PORTABLES



$219

6 CHANNELS and 12 MONTH WARRANTY

Features:

* solid-state T/R relay
* PA protection
* 5 helical resonators
* 10/1 watt

IC22A

Complete with cables, mobile bracket, mic, manual and 6 channels from the WIA Bandplan.

The IC21A is the 10 watt base station or mobile (146-148MHz) with variable power control, adjustable deviation, 24 channels, built-in discriminator meter, S meter, power/swr meter, PA protection and modular circuitary . . . In addition:

* low intermod, due to MOS-FET RF amp and 5 helical resonators
* calibrate position netting switch allows the IC21A to listen to itself on simplex channels.
* The RIT control offsets the receiver frequency to bring in signals which are not properly calibrated
* runs from either 240V or 13.8V
* complete with mic, cables, manual, 3 channels and the VICOM 12 month warranty.
* PRICE: $298.

TRANSVERTERS

QUALITY QM70 TRANSVERTERS

High Power 28/144 Transverter:
This transverter accepts low level drive from an HF transceiver in the 28-30 MHz Band, and transverts this signal to the corresponding frequency in the 144-146 MHz band.
Similarly, signals being received in 144MHz band will appear at the corresponding frequency on 28-30 MHz band on the HF transceiver. All power and drive requirements can be taken from accessory sockets of Uniden 2020, TS-520, FT101, FT200, etc.

Specifications:

Modes: CW, SSB, AM, and FM
Input Drive: Typically ½ watt RMS, 1 watt RMS maximum
Output power: Depending on P.A. anode voltage used, typically 100 watt pep.
Power requirements: Normally drawn from the HF transceiver, (Uniden 2020, FT101, etc)
12.6V AC at 2 amps
100V negative at 10Ma
300V positive at 100Ma
630-1000V positive at 200Ma for the P.A.
NOTE: The P.A. absolute maximum is 100V dc
Metering: P.A. current meter on front panel
Cooling: No special requirements provided that normal airflow around the unit is unrestricted.
Interconnections:
28 MHz low level drive via phono socket.
28 MHz If outputs via Belling Lee sockets.
Antennae via SO239 socket
Power supplies through multi-way lead supplied.
Size: 9½"-5"-6" approx.

$238

144 MHz Solid State (2W) transverter
Developed as a means of getting going on 2M SSB, this sophisticated transverter accepts low level drive from 28-30 MHz and transverts to 144-146 MHz.
Similarly, received signals on 144-146 MHz will appear at the corresponding frequency on the HF transceiver.

Features:
* All solid state construction
* 12V negative earth operation
* Proven converter with 2RF stages and MOSFET mixer.
* 2 IF outputs from converter
* Output power 2W (max)
* Broad-band power held plus minus 1db across 144-146 MHz band.
* Antenna changeover relay included
* Sufficient to drive 6/40 to full ratings.
* Size 10"-5"-2" approx.

$126

QM-70 70cm transverter 10/70cm 26w pep output $ 201

antenna

HF TRAP DIPOLES BY RAK

MIDY 111N 40-10m	$38
MIDY VN 80-10m	$44
AL48DXN 40/80m	$38
AL24DXN 20/40m	$28
A 4VPN 80m	$28
A 8VPN 40m	$30

HF ANTENNAE BY HY-GAIN

14AVQ 10-40m trap vert.	$69
18AVT-WB 10-80m trap vert.	$95
TH3jr 10-15-20m 3 el yagi	$145
TH3MK3 10-15-20m 3 el	$190
TH6DXX 10-15-20m 6el yagi	$240
203BA 20m monobander 4el	$185

WHIPS

HF HUSTLER RESONATORS
Precision wound with optimised design for each band, adjustable tip rod for lowest VSWR and badn-edge markers:

RM-80 (80 metres)	$26
RM40 (40 metres)	$25
RM20 (20 metres)	$20
MO-2 mast for resonators	$26
BM-1 bumper mount	$15

VHF

Lindenow 2m 5/8 fibreglass	$21
base for above	$2.55
M25 Scalar 2m 5/8 fibreglass	$16
M21 Scalar 2m ¼ s steel	$9
M60 Scalar 6m ½ fibreglass	$12
MGB magnetic base	$33
MB Scalar standard base	$5

CRYSTALS

WIA Band Plan Xtals

RIG	CRYSTALS CURRENTLY IN STOCK	PRICE*
IC22A IC21A	R1-R7, A1-A7, Simplex Jap A,B Ch "A", 40,49,50,51,52,53,65, 147.63, 74	9.00 p
IC202	144.5, 144.7, 144.9, Oscar	6.00 e
KP202	R1-7, Simplex 40,50,53	9.00 p
SV230	R1-7 Simplex 40, 50	9.00 p
TR2200G	R1-7, Simplex 50	8.00 p
FT101E FT101	11m, 160m, WWV	4.50 e
TV502	145-146 xtal	4.50 e
TV506-	52-53 xtal	4.50 e
FT2FB	R1-7	4.50 e
FT75B	7.1,14.15,14.19,14.24,14.21, 21.25,21.415,21.43,28.59, 28.05,28.38,28.35,28.1	4.50 e

* ADD P&P 50 CENTS

HAM-II Rotor

Control Box

ANTENNA ACCESSORIES

HAM HEADQUARTERS!

Ham-11 rotator, 230V ac with indicator control units	$168
Oskerblock SWR200 swr/pwr meter with ranges 2/20200/200w to 200 MHz	$49
Leader LPM885 swr/pwr meter	$78
ME-UHF swr/pwr meter 15/5w	$69
Balun BL-50a 52 ohm	$18
Balun BL-70a 75 ohm	$18
CX-2A 20pos coax switch	$23
CX-6A(A) 6 pos 52ohm coax sw	$54
BTF-1 600 ohm balanced feeder	$12
CO-AX RG58AU 45c per metre	
SH-7E lightning arrestor	$15

NEW 2M RINGO RANGER ARX-2

The new Ringo Ranger ARX-2 2m omnidirectional offers 6dB gain over a ¼ wave whip. Features 3 half waves in phase and a 1/8 wave matching stub with an extremely low angle of radiation for better signal coverage. Tunable over a broad frequency range and perfectly matched to 52 ohm coax $35
Extension to old AR-2 ..... $15

VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM

- **Phase Locked Loop circuitary for optimum stability**
- **Separate USB/LSB/CW 8-pole crystal filters as standard and no frequency change required when going from USB to LSB**
- **Maximum accessibility to plug-in PCB modules, even the front panel can be swung out for easy servicing. Full spares catalogue plus parts available.**
- **Pair 6146B's in final with screen voltage stabilisation for minimum distortion products and a very clean output signal**
- **90 day warranty**
- **Price $570 including mic, cables, plugs, English manual**

Frequency Ranges;

Bands(meters)	Frequency(MHz)
80	3.5 ~ 4.0
40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
10(B)	28.5 ~ 29.0
10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5
WWV	15.0

Mode of Operation;	LSB, USB, CW and AM
Input Power;	180 Watts DC INPUT SSB & CW 90 Watts DC INPUT AM
Carrier Suppression;	50 dB
Sideband Suppression;	50 dB at 1,000 Hz
Spurious Radiation;	Down 40 dB or more
Distortion;	Down 35 dB or more
Microphone Impedance;	High
Modulation Method;	Balanced modulation(SSB) Low power modulation(AM)
Transmitter Frequency Response;	300 to 2,700 Hz(down 6 dB)
Frequency Stability;	Less than 300 Hz drift in starting Less than 100 Hz drift or less after 30 minutes of warm up
Antenna Output Impedance;	50·75 ohms unbalanced
Receiver Sensitivity;	0.3μV S/N 10 dB (at 14 MHz) SSB/CW 1μV S/N 10 dB(at 14 MHz) AM
Image Interference Ratio;	−50 dB and more(at 14 MHz)
IF Interference Ratio;	same as above
Receiver Selectivity;	SSB/AM 2.4 kHz at −6 dB and 4.0 kHz at −60 dB CW 600 Hz at −6 dB and 1.5 kHz at −60 dB
Audio Output;	2.5 Watts or more (10% distortion at 4 ohms load)
Audio Output Impedance;	4 ohms
Power Source;	100/110/117/200/220/234 Volts AC 50/60 Hz 13.8 ±10% DC
Power Consumption;	AC : 350 VA at the maximum final input DC : 22A at the maximum final input. 7A in receiving with final tubes heater"on" and 2A with heater"off"

uniden

Prices and specifications are subject to variation without notice.

SURPRISE PACKAGE

ONE YEAR OLD AND BURSTING TO GIVE AUSTRALIAN AMATEURS THE LATEST!

Yes, VICOM celebrates its first anniversary this month and looks forward to bringing you the greatest range of state-of-the-art Amateur gear during the next 12 months.

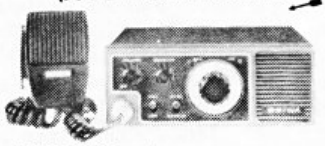
VICOM

PTT MICROPHONES-

Yaesu YD-846 High imp	$22
Trio MC-15 low imp	$18
Trio MC-10 high imp	$18
Icom for IC22/21A	$15

SOME 1st ANNIVERSARY SPECIALS

(A FEW UNITS ONLY AVAILABLE AT THESE PRICES)



This popular rig runs 25 watts 2m fm mobile and is ideal for repeater fringe areas. Offer includes 3 channels, mic,cables,English handbook and 90 day warranty
Normally $210
THIS MONTH $165

SV-230

TR-7200G 2M FM Transceiver

- Top quality VHF FM transceiver with exceptionally high reliability characteristics.
- Has improved electrical characteristics—2-signal characteristic, sensitivity, cross modulation, and spurious and temperature advantages.
- Built-in call channel (CH 1) switch and 2-pole crystal filter.
- External VFO can be used.
- Full accessories complement unit, including newly designed mike, mounting bracket, mike hanger, and others.

NORMALLY $235
THIS MONTH $170 (including 90 day warranty)

The D-60 features 8 digit display with overflow indicator, scaler, ac/dc operation, high stability, 50mV sensitivity, 90 day warranty. Works up to 160MHz
normally $360
THIS MONTH $280 !

DIGIPET D60

The DV-21 PLL Digital VFO is a unique synthesiser to complete your ICOM 2M station (it can also be interfaced with other rigs). Runs from either 13.8V or 240V and can scan either empty frequencies or those being used. In addition, two programmable memories for favourite channels can be selected.

OVER 20% OFF NORMAL PRICE !
Normally $285
THIS MONTH $220 (incl 90 day warr)

DV-21

SOLID STATE

5 Band 200 Watts

DON'T LET ITS SMALL SIZE FOOL YOU. The Atlas transceiver is packed full of the most advanced, state-of-the-art engineering, and provides unequaled performance in both transmit and receive modes. There is no other transceiver on the market with as many outstanding superior features, regardless of size.

MODEL 210x or 215x With Noise Blanker **$695**

VICOM PETER WILLIAMS B.Sc.
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13. Locate the tinned copper lead from the 80 Mx tap on the final tank inductance. Clip it off where it connects to the wiper of S1m. Unsolder the other end from the 80 Mx tap. Using a screw driver, press the 80 Mx tap turn down in line with the other adjacent turns. Straighten out a paper clip and make a small 90° "hook" at one end. Using a pair of long nose pliers push this hook between the 80 Mx tap and the next winding (toward the back). Pull the next turn up to form the new 80 Mx tap. That is, we increase the 80 Mx PA tank by 1 turn. Tin the new tap and reconnect the 80 Mx lead. Solder the other end of this lead to the 80 Mx contact of S1m.
14. Wire in a new link of 16 or 18 SWG tinned copper wire from the far end of the tank coil to the wiper of S1m. We now have our new 160 Mx tank circuit.
15. Lift the lead from the half of the loading capacitor connected to the 80 and 40 contacts of wafer S11 to the wiper of S11. This means that both sections of this capacitor are in parallel on all bands. A slight change in the position of the LOAD control will be noticed on all bands.
16. Cut the link between the 40 Mx and 80 Mx contacts on S11. Wire in a new link between the 80 Mx and AUX 2 contacts. This keeps the 40 Mx loading capacitance at its original value and allows the 80 Mx loading capacitance to be used on 160 Mx as well.
17. Wire in a 1500 pF 600 V mica capacitator from the 80 Mx contact of S11 to ground. Use the earth lug installed previously. This restores the capacitance of the PA pi network loading circuit to its original value.
18. Replace the antenna change over relay.
19. Plug in a 7.520 MHz crystal. (Refer to step 6 of the 11 Mx conversion). Use the socket nearest the side panel.
20. Set the BAND switch to AUX 2, connect a dummy load, switch the set on and allow 10 minutes warm up.
21. Turn the audio gain up, switch on the 25 kHz calibrator and tune to the 1.825 MHz signal. Set the PRESELE control to 2. Peak signal to a maximum by adjusting the slugs in the RF and mixer coils. It should now be possible to peak the calibration signals from 1.800 MHz to 1.875 MHz using the PRESELE controls. If not, set slugs to peak at 1.800 with PRESELE fully in. Repeak PRESELE on 1.825 MHz. Peak 'S' metre indication of calibrators signal using TC1109. This adjustment is quite broad and is not critical.
22. Switch to TUNE mode and advance the MIC GAIN CARRIER control to obtain 100 mA plate current. The gain control should be in about the same position as for 80 Mx. Peak drive using driver plate coil slug. Check that PRESELE control is at (or very close to) position at which maximum drive is obtained. Adjust PLATE and LOADING controls to obtain maximum output. Switch to receive. The conversion is now complete. Replace top and bottom panels. All you need now is an antenna and probably an antenna coupler. (Start looking up those back issues of AR). ■

DC AMPLIFIER FOR SWR BRIDGE

Cor Hagoort VK5YH
16 Gilbert St., Ingle Farm, S.A., 5098

This project originated when the author wanted to use on HF, the VHF microstripline SWR bridge published in Electronics Australia April 1971. The coupled line length of 4.5 cm does not produce sufficient output voltage on the HF bands. The answer is to use a DC amplifier to amplify the voltage from the SWR bridge and the popular 741C IC operational amplifier was chosen to do the job.

Full scale deflection of the 1 mA meter was easily obtained right down to 40 m. In fact when operating a 250W PEP input transmitter on 40 m, it was necessary to turn the sensitivity control back to half its maximum setting. Even on 80 m it is possible to get nearly full scale deflection.

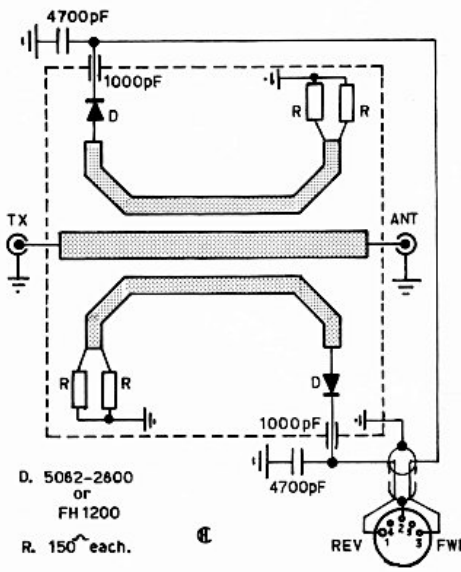
The 100K linear potentiometer which serves as the sensitivity control is in series with the hot carrier diode and improves the linearity of the diode output. It must be stressed that the unit must be completely shielded. (Yes, even the 1 mA meter.)

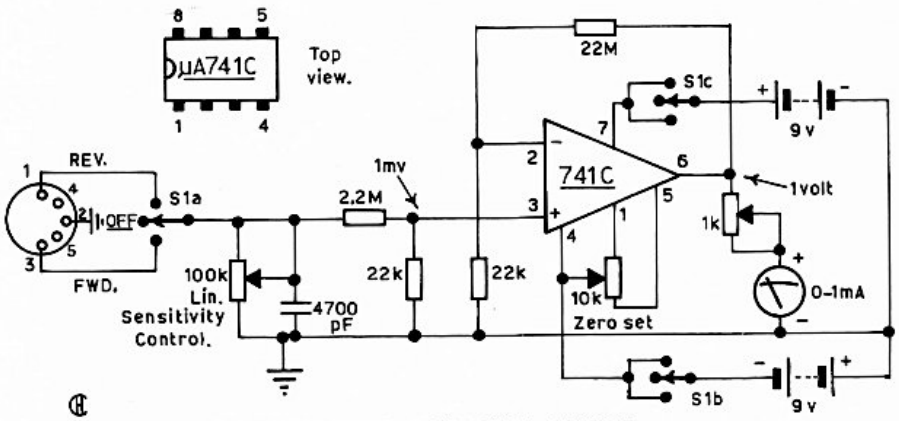
If this is not done the IC will pick up any RF floating around the shack and this will result in full scale deflection of the 1 mA meter.

A 0.1V signal from the SWR bridge will be reduced to approximately 1 mV by the voltage divider made up of the 2.2 m isolating resistor and the 22K resistor between pin 3 and earth. The gain of the 741C has been set at 1000 by means of the 22 m feedback resistor. Consequently the 1mV input at pin 3 will be amplified to 1V output across a 1K load at pin 6. The 1K load is made up of the internal resistance of the 1 mA meter and the 1K trim pot.

It is possible to increase the sensitivity 10-fold by reducing the 2.2 m isolating resistor to 220K. If this is done however the zero indication of the meter will vary slightly when the setting of the 100K sensitivity control is varied.

NOTE: Printed circuit boards for both the 50 ohm and 75 ohm versions of the microstripline SWR bridge are obtainable from the Victorian Disposals Committee. ■





DC AMPLIFIER FOR S.W.R. BRIDGE.

THE X BEAM

A MONO BAND ANTENNA FOR 20 METRES

Sam D. Kaufman VK2SK
23 Isobel St., Belmore, 2192

Here is an article on what must be the cheapest way of getting your DXCC. It describes the X-Beam, a $20.00 antenna that puts more "sock" into your signal than a linear.

This article was received as one of the technical editors, VK3AFW, was preparing a similar article. Portions of this latter article are also included here.

The following is not meant to be a Technical Report on X-Beam antennae as there is still much room for experimental work that can be carried out to evaluate more completely its operational potential. Therefore, here are my own experiences, supplemented by the fact that many others, "DX-getters", work this type of antenna with excellent results.

I was compelled to write this article because I feel that the X-Beam antenna is not as widely used as it should be.

Perhaps it is because of the little publicity given to this type of antenna in Australia for the last decade or so. Therefore, if I succeed in stirring some much deserved interest in X-Beam antennae, then my efforts in writing this article would be worthwhile.

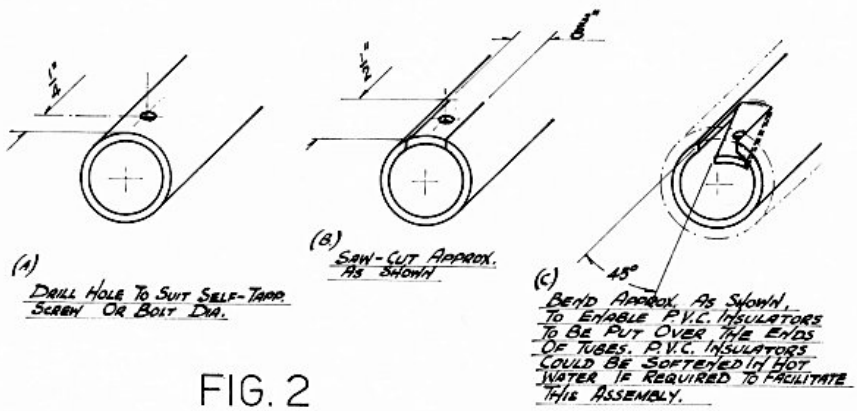


FIG. 2

Due to its comparatively low cost, the X-Beam antenna is referred to as "The poor man's beam". But its performance is by no means poor. Low cost and high performance make this aerial an attractive choice for construction by radio amateurs.

Needless to say, I make no claim for the originality of X-Beam antenna. It is a well-known fact that in the early days of TV in England the X-Beam antennae were used (in the fixed vertical plane) in very large numbers and with great success.

DESCRIPTION

The X-Beam is a two element 14 MHz beam without a boom. The forward gain compares very favourably with the usual tri-band 3 element beam. The two elements are supported at the centre and are bent to form two back-to-back Vee shapes. This is shown in Fig 3. The majority of the antenna current flows in the aluminium tubes which have low resistance. Wire "tails" are added to the tubular elements to resonate the beam. The losses in the antenna are lower than would be the case with a wire beam, and much lower than trapped antennae.

Excellent matching can be made to either 50 or 75 ohm feeders.

The antenna may be tuned for maximum forward gain (about 8-9 dB) or for maximum front to back ratio (12-30 dB).

It is not necessary to spend hours tuning it, as adequate performance will be obtained by using the dimensions given in Fig 3.

The construction produces optimum average spacing between the elements and enhances the gain due to the Vee structure.

CONSTRUCTION

There is more than one way to start building an antenna such as described here. From my own experience I would suggest a start at the *centre piece* or the *Hub Assembly* if you would prefer to call it that. The *centre piece* could be made by welding four 1" angle irons each about 6" long, at 90° angle to a cylindrical hub with a hole in its middle for locating and fixing a mast or an adaptor tube through it. In this case, provision also must be made to clamp the insulated ends of the *Radial Arms* tubing to the centre piece angle irons and to weather-proof such an assembly. On the other hand, you may wish to please your neighbourhood and make a neat job out of it by purchasing the Centre Piece Hub Assembly complete with the tube insulators and clamping bolts. This CPH assembly was specifically designed and developed just for such a purpose. Made in two

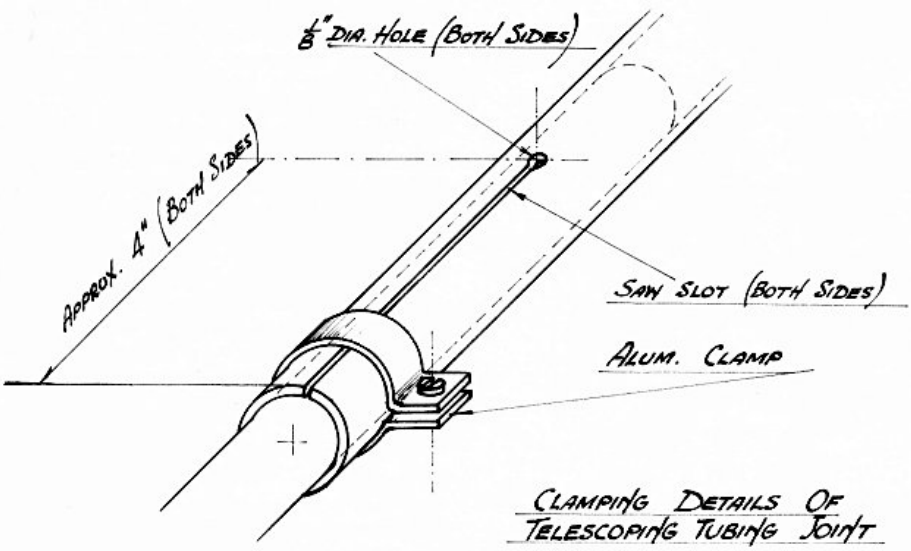


FIG.1

halves, which are cast in aluminium alloy, the halves are clamped together with (4) ⅜" diameter galvanised steel bolts.

The whole assembly weighs only 3½ or 4½ lbs., depending on the size of hole to suit your mast or adaptor tube diameter. (This could vary from 1" to 2" in diameter). To the best of my knowledge, such Centre Piece Assemblies are still being made and are available at what I consider very reasonable prices. (See advertisement in AR July 1972, page 19 — Utility "X" Castings, P.O. Box 55, Smithfield, 2164).

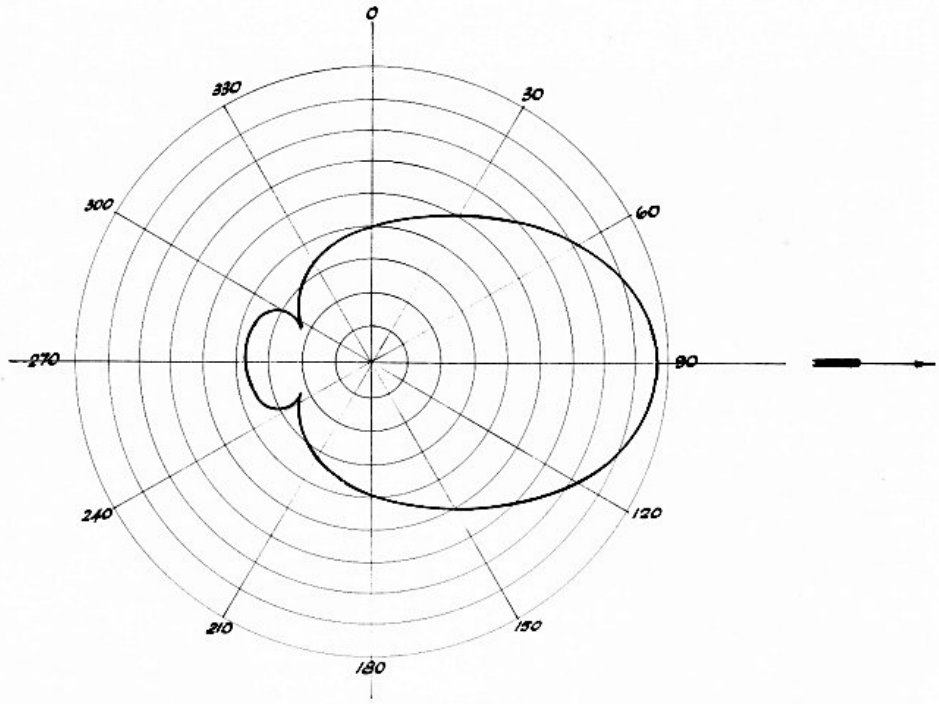
The X-Beam uses a driven element and a director. The linear length of both elements being slightly longer than similar elements in a conventional Yagi aerial. The driven element and the director are fixed securely in the form of two Vs, back-to-back by a centre piece spacing at 90° angle. The total assembled length of each *radial arm* tubing being 13 feet long. Hard drawn aluminium tubing is best suited for arms construction.

If a "King Post", say 3 feet high and ¾" OD light gauge tube, is fitted at the top of the Centre Piece to carry four nylon fishing line stays, then the tubing used for the radial arms could be of lesser diameter than when used without stays to support it.

A proven combination of tubing diameters and length used for each of radial arms is: ⅝" OD 12 feet 6" long tubing telescoping into ¾" OD. 12" long at Centre Piece end. Note that 6" extra length is required to telescope into larger diameter tube on assembly.

If constructing an antenna without the "King Post" and stays, then another proven combination of tubing diameters and length used is ½" OD x 4 ft. 6" telescoping 6" into ⅝" OD x 4 ft. 6" telescoping 6" into ¾" OD x 5 ft. long tubing.

The total assembled length of the radial arms being 13 ft. in either case.



HORIZONTAL RADIATION PATTERN OF AN "X-BEAM" AERIAL

FIG. 4

It is just as well to mention here that in the latter case free radial arms (i.e. without supporting stays) would give about one foot of droop from horizontal but this does not seem to have any detrimental effect whatsoever on performance of the aerial. An even simpler construction uses ⅞" OD tubing of 13 ft. length for the radials. (Support is mandatory here VK3AFW).

Anodised aluminium tubing should be stripped of anodic film where required to make a sound electrical contact.

There are several ways to securely fix a joint of radial arms tubing.

If the telescoping fit in a tubing is very tight, then it will be sufficient to drill a hole of suitable diameter right through the joint and then fix two short stainless steel self-driving screws per joint.

On the other hand, if the telescoping fit is a bit on the slack side, and length adjustment for tuning purposes is desirable, one can clamp the smalier tubing inside the larger diameter slotted tubing. (Refer details Fig 1). All telescoping joints must be thoroughly sealed for weather protection by painting on a suitable varnish or caulking compound when finally assembled.

Radial arms insulators are cut from PVC or nylon tubing having a suitable inside diameter, approximately 4" or 6" in length (4) pieces required. The thickness and quality of the RF insulation is not critical, as this is a low voltage point.

The tapping of radial arms at centre piece ends could be affected as suggested by referring to Fig 2, or any similar arrangement. The radial arms of the Vs being extended and folded back to form 'tails' of the required length for resonance. (Refer Fig 3). Outside ends of the radial arms could be tapped in any convenient way. Again special care has to be taken to protect all joints from water and so prevent galvanic action which may set in when using dissimilar metals for making wire 'tails', brackets and bolts, especially if these parts are made of brass or copper.

Perhaps it would be of interest to note here that it is possible to forgo the use of the wire 'tails' altogether. Naturally, such an arrangement requires corresponding length compensation of radial arms tubing instead.

Some X-Beam enthusiasts, like Mr. Andy Adie ZL30D, favor straight arms — no tails

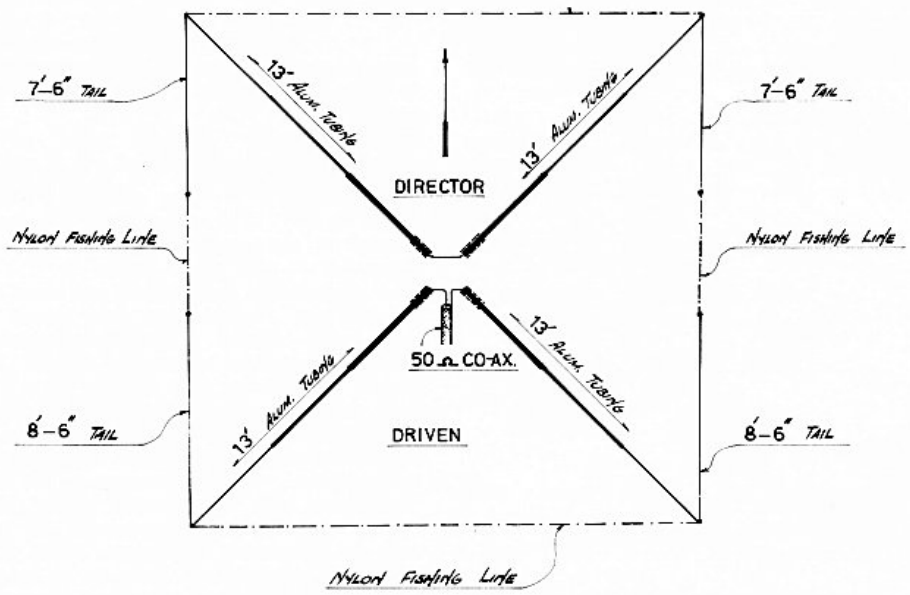


FIG. 3

arrangement. While this has been tried at VK2SK with excellent results and low SWR, it was found to be extraordinarily sharp in tuning.

The driven element is fed with 50 ohm co-ax cable and in my case a balun was not required, but some 'hams' use a balun or a stub to balance the feed. The co-ax cable passes from inside the centre piece, down through the steel water pipe mast and emerges at any convenient point further below.

By dropping the co-ax down inside the mast the possibility of TVI is greatly reduced. In my case, there was no TVI experienced. It also prevents moisture running down the co-ax.

Please note that the length of 'tails' in fact is relative to the cross-section of the wire. To quote a very reliable source on X-Beam expertise from New Zealand: "it was found that from thin nichrome wire to 20 g. copper, the length of 'tails' could vary by a foot".

Therefore, the length of 'tails' on director and driven elements as given in Fig 3, apply only when 24 g. hard drawn copper wire was used.

The height of an aerial is always important for best results; the X-Beam is no exception, and from my experience it has been found to operate at its best when at a height of ½ wave or more from the ground level.

Nevertheless, even during the initial tuning adjustments, with the mast leaning against the shack and radial arms tubing only 2 feet above the iron roof, contacts on telephony were made with USA, New Zealand, and The Islands.

To utilise the directional properties at will, an X-Beam antenna has to be made rotatable in the horizontal plane.

Again there are many different ways to rotate a 'Beam' aerial.

Some of them are simple, and some others are highly sophisticated. I feel that it would be outside the scope of this article for me to indulge in an attempt to describe the pros and cons of each method. In my case, the antenna mast is just outside the shack and it was relatively easy to bring rotary control 'at finger tips' inside the shack by utilising bicycle sprocket wheel-and-chain transmission.

TUNING

Some constructors insert a 250 pF variable capacitor at the apex (centre) of the director and adjust this for maximum gain or front-to-back ratio. The length of the tails on the driven element may be adjusted for resonance at your favorite operating frequency.

If the tails are taped to a fishing line strung between director and driven element, they may be quickly pruned with side cutters. Both elements are closely coupled and tuning one interacts with the other. If the director is open circuited at the centre, the driven element may be readily resonated.

The director can then be tuned for best performance. The VSWR should be less than 2:1 over most of the 20 Mx band and quite low at the optimum frequency.

In conclusion, I would like to acknowledge the help and expert advice given to me during the construction and the initial operating stages of the X-Beam aerial, especially the Polar Diagram (Fig 4), typical for an X-Beam aerial, kindly submitted by J. F. Harper ZL2NH. While plotting this diagram, he was assisted by Ray Hoare VK9RH.

Much advice and guidance was also given by Andy Adie, ZL3OD, and last, but not least, Vladimir Vasylenko ZL2NH, who designed the cast aluminium alloy centre piece to suit X-Beam aerials. ■

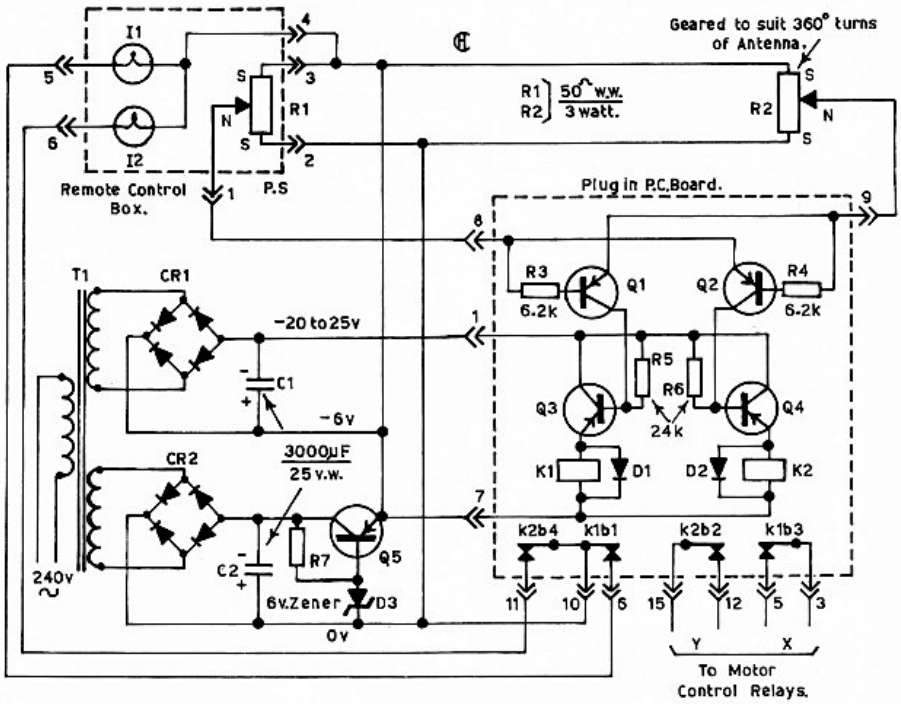
TRANSISTORISED ANTENNA TURNING UNIT

E. Stephenson
1 Emily Ave., Clapham, S.A., 5062

This is an extract from a lecture on antenna turning and indicating devices given by Steve VK5ZB at the January 1975 meeting of the WIA, SA Division.

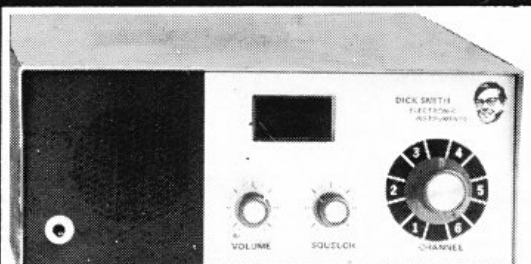
As can be seen by the circuit, the unit is very simple and inexpensive.

It works on the principle of the different potential between the wipers of R1 and R2. When the voltage is the same, transistors Q1 and Q2 will be cut off, Q3 and Q4 turned on, and relays K1 and K2 will be energised.



Q1.2.3.4... 2N404 (AC128 etc. should be suitable Ed.)
Q5... Any large N.P.N. Power Transistor eg. ASZ15
CR1.CR2.D1.D2 ... EM404 .
D3-6.1 volt zener.
K1 . K2... 18 v.DC . 4 switch relays.
C1 . C2-3000µF 25v. working.
R1.R2-50Ω 3 watt(ww)
R3.R4-6.2k
R5.R6-24k

normally closed . k1b.k2b.
normally open . k1a . k2a.



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SPECIFICATIONS 15 transistors,15 diodes : 6 channel capacity : 50ohm antenna : 12 to 16V nominal power supply or 240V ac : 600-2000ohm mic impedance : 8ohm speaker : 1uV receiver sensitivity Selectivity 50db down at 10kHz : Automatic Noise Limiter : 1.5W audio output : 455kHz IF : Power consumption Rx 200mA @ 13.8V,TX 900mA without mod. Transmitter output 5W : Frequency tolerance 0.005% : Signal strength and power meter : Mic has in built matching transformer.

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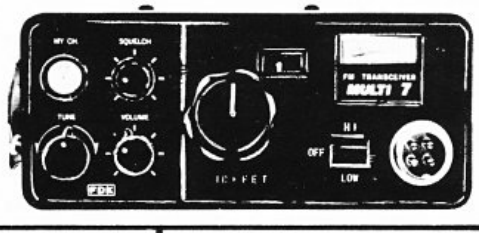

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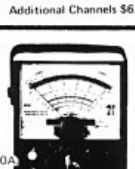

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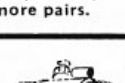

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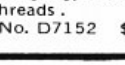

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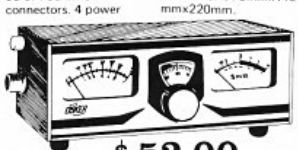

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SPECIFICATIONS

Receiver	
Receiving system	Crystal controlled superheterodyne
Sensitivity	0.7μV
Squelch sensitivity	0.5μV
Transmitter	
Modulation	100% (with over modulation limiter)
RF input power	1W
General	
Semiconductors	11 transistors, 1 IC, 8 diodes
Frequency control	Crystal
Channels	2 channels (1 channel fitted)
Connectors	Earphone jack
Speaker	2–7/8", 8 ohms, permanent dynamic speaker
Dimensions	50 x 250 x 76 mm
Weight	680g

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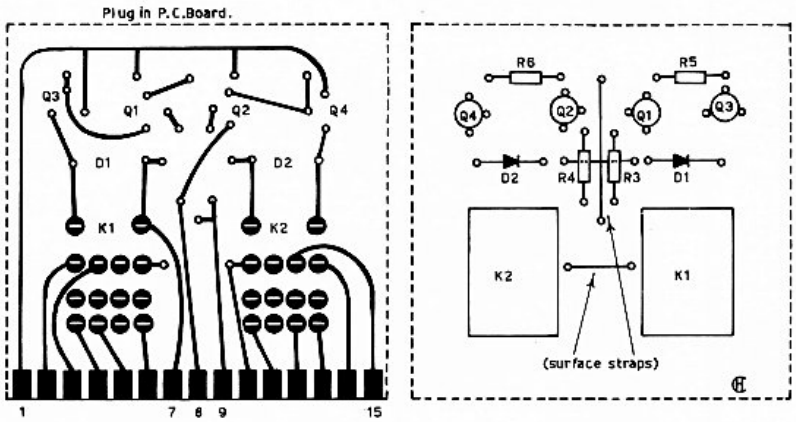
When the wiper of R1 is shifted, say toward the negative end, then the potential at the base of Q1 will be more negative than its emitter, and Q1 will conduct; if sufficient voltage drop is produced across R5 Q3 will be cut off. Q3 being cut off will release K1 relay and its b (normally closed) switches will close and start the antenna rotator turning. This will shift R2 arm until the voltage at the emitter of Q1 is about equal to the base. Q1 will be cut off turning Q3 on and energising K1 opening the b switches and turning off the rotator.

If the R1 arm is moved toward the positive end of R1, then Q2 will be turned on because its base has become more negative than its emitter. Q2 on will turn Q4 off because of the resulting voltage drop across R6 and K2 will release. This will start the beam rotator in the opposite direction until the voltage at the base and emitter of Q2 are about equal. Q2 will be cut off and Q4 will conduct and energise K2 turning off the rotator.

A few things worth watching on this system:

1. R1 and R2 are 50 ohm wire wound.
2. R2 is geared to the antenna shaft at a ratio of 1 to ¾. This will let the beam rotate a few degrees past south in each direction.
3. R2 shaft is coupled to its drive shaft by a spring loaded drive to prevent damage to the pot should the beam try to drive past end of pot.
4. It was found that the dial on the control box had to have a flexible pointer operated by a small stud in the knob and a slightly elongated hole in the pointer, or errors in beam heading of up to 12° will occur. This is necessary because we are dealing in a .2 volt change to turn on Q1 or Q2 and therefore the dial would need 2 sets of calibration on it, one when it was being turned from south through east, north and west, and the other when it was being turned from south through west, north and east. On the demonstration model, two calibrations were used, one in red, the other in black, and a red and black arrow to show which one to select by direction of rotation of knob. On this model they were approximately ⅛" apart. ■



1. −24v
2. k1b4 com.
3. k1b3 com
4. k1b4
5. k1b3
6. k1b1
7. −6v(0 for −24v)
8. R1 v
9. R2 v
10. k1b1/k2b4 com.
11. k2b4
12. k2b2
13. k2b1
14. k2b1 com
15. k2b2 com

R3-R4 6.2k
R5-R6 24k
D1-D2 EM404
Q1.2.3.4. 2N404
K1. K2 380Ω 18v

QSP

PROVOCATION OF THE MONTH
What does the Institute do for me?

1976 CONVENTION — AGENDA ITEMS
At the 1974 Federal Convention a Motion (74.17.04) was passed unanimously that Convention Agenda Items should be called for much earlier than hitherto so that they could be published in AR to enable members to examine them and write to their Federal Councillor advising him of their views prior to the Convention. Agenda Items suitable for consideration at Convention level should be sent to your Division as early as possible. If the Divisional Council concerned approves the submission of an Agenda Item advance publicity can then be given through the pages of AR if time permits or via the Divisional insert into AR or other Divisional bulletin.

CATHODE RAY TUBE EQUIVALENTS
An extensive list of Cathode Ray Tube equivalents was recently received from Lance Harding (VK3AHL); regrettably the list is too long to publish in AR; however, should any reader desire a copy for reference, please forward your request together with a SASE to the WIA office, P.O. Box 150, Toorak, 3142, Vic.

6M BAND IN USA
This band may be in trouble according to Prose Walker's comments at the Texas VHF FM Society's Convention. Prose seems to feel that there's a definite push on to add Channel 1 to the VHF TV spectrum and Channel 1 is 6 metres. Ham Radio Oct. '75.

DUTCH ABOLISH CB SERVICE
Is the heading of an item in Collector and Emitter Oct. '75 with credit to HR Report . . . "in Netherlands after widespread abuses convince officials that cleanup is impractical. All 27 MHz licences have been revoked, and mobile monitoring vans have been shutting down illegal stations by marching in the door and confiscating their equipment. The nation-wide crackdown, reported in Dutch papers as being against "illegal radio amateurs" (demonstrating that media confusion as to who's a ham and who is something else is not a uniquely American problem) has been understood to be quite effective". The next item continues "How about the Dutch! seems as if the FCC has a tiger by the tail with our 'CB' program. Question, who has the stolen CB and amateur gear? Answer, the criminal".

NEW CALL SIGN SERIES
The call sign series D2A-D3Z has been allocated provisionally by ITU to Angola according to Radio Communication Dec. '75

LICENCE FEES
Radio Communication Dec. '75 contains information that the UK amateur radio transmitting licence has been increased from £3 to £4.80 from 1-12-1975. At the present rates of exchange this is equivalent to a little under $8.00 in our money. This 60 per cent increase (applicable to all standard radio licences except BC receiving) was said to have become necessary because the income from fees is no longer sufficient to cover the cost of licensing and administering the particular uses of radio. The total number of amateur licences in force at 31-5-1975 was 26,410 according to Rad. Comm. Oct. '75. The RSGB membership at the end of July was shown as 18,516 (15,576 UK corporate plus 1113 UK associates plus 1827 overseas).

NEW CALL SIGN SERIES
The IARU Region 1 news Sept. '75 advises that the ITU have provisionally allocated the call sign series C8A to C9Z to Mozambique.

INTERFERENCE
One of the main exhibits at a local exhibition in the UK will be a demonstration by the UK licensing authority of the use of filters to overcome interference to television caused by the high-level field of nearby amateur transmitters. It was also hoped that facilities would be provided for visitors to have their own aerial filters aligned using a spectrum analyser and signal generators. Precis of a news item in "Radio Communication" Oct. '75.

WARC 1979
Ham Radio Nov. '75 reports that the WARC 1979 Working Group on Amateur Radio in the USA intends striving for more spectrum in the HF bands. In the VHF/UHF spectrum competition is tougher, they said. New bands proposed were reported as 10.1-10.6 MHz, 18.1-18.6 MHz and 24-24.5 MHz. Proposals were also made to extend the 40m band to 7.5 MHz, 20m to 14.5 MHz and 15m to 21.5 MHz, plus a totally new band in the 150-200 kHz region.

ASCII
Reported in Nov. '75 QST is the news that the FCC issued a special temporary authorization for the experimental use of the American Standard Code for Information Interchange 8-unit teleprinter c in connection with Oscars 6 and 7.

MORE MEMBERS
A quote from Director, VK2AKX's end of year message in Westlakes Dec. '75 Newsletter — "Our parliamentary representatives have promised more assistance in the future and, the more members we have, the more assistance we are likely to get because, as our hobby gains greater recognition, we can have a greater impact on the community in the field of community recreation and training in technical skills".

EHF
"Since 14 Nov. American amateurs have been able to use frequencies within the bands 48-50 GHz, 71-76 GHz, 165-170 GHz and 240-250 GHz and all frequencies above 300 GHz. The RSGB has for some time been trying to get a similar allocation for UK amateurs, but so far without success. However, as was reported in Microwaves last May, the Home Office is prepared to consider requests to work at frequencies above 40 GHz on the basis of individual applications". From "Microwaves" in Radio Communication Jan. '76.

TEN-TEN INTERNATIONAL NET
A letter from ZL1ARO, Geo. Currie of P.O. Box 57, Ngatea, New Zealand advises he has been appointed a DX Manager for VK-ZL for the Ten-Ten International Net of Southern California, Inc. which promotes amateur activity on the ten metre band as one of its objects. If you already belong to this organisation or if you would like further details why not contact or write to George direct. ■

SIDEBAND ELECTRONICS SALES and IMPORTS

UNIDEN 2020 AC-DC transceivers 10 to 80 M. **$550**

TRIO-KENWOOD TS-520 AC-DC transceivers 10 to 80 M. **$530**

YAESU MUSEN FT-101-E AC-DC transceivers 10 to 160 M. **$650**
model YC-335-D digital frequency meter 0-200 MHz **$250**

TRIO-KENWOOD model QR-666 170 KHz to 30 MHz AC-DC receivers **$300**

DRAKE model SSR-1 Wadley loop 500 KHz to 30 MHz AC-DC receivers **$325**

BARLOW WADLEY model XCR-30 MK-II receivers **$225**

HY-GAIN antennas 14AVQ 10-40 M. verticals, 19' tall, no guys **$65**
18AVT-WB 10-80 M. verticals, 23' tall, no guys **$90**
TH3JR 10-15-20 junior 3 el. Yagi 12' boom **$135**
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom **$180**
TH6DXX 10-15-20 senior 6 el. Yagi 24' boom **$225**
HY-QUAD 10-15-20 cubical quad Yagi 8' boom **$200**
TIGER ARRAY 204BA 20 M. 4 el. Yagi 26' boom **$190**
BN-86 balun for beam purchasers only **$18**

ANTENNA ROTATORS CDR AR-22 junior for light and vhf beams **$50**
CDR Ham-II senior for all but 40 M. hf beams **$165**
KEN KR-400 for all medium hf beams with disc brake **$100**
All three models rotators complete with 230V AC indicator-control box.

4-conductor light cable for AR-22 **20 cents per yard**
12-conductor light cable for Ham-II **30 cents per yard**
8-conductor heavy cable for Ham-II **70 cents per yard**
6-conductor heavy cable for KR-400 **60 cents per yard**

DRAKE W-4 SWR-WATT METER 0-200 and 0-2000 Watt scales **$60**

DRAKE TV-1000 TVI Low pass Filter **$25**

SINGLE METER SWR METER **$15**

TWIN METER SWR METER **$22**

MARK MOBILE ANTENNAS Helical 6' long HW-40 for 40 M. **$18**
High power KW-40 for 40 M. **$25**
HW-20 for 20 M. **$16**
Tri-band HW-3 for 10-15-20 M. **$25**
Swivel mobile mount and chrome plated spring for all **$12**

ASAHI MOBILE ANTENNAS AS-2-DW-E¼ wave 2 M. mobile whip **$8**
AS-WW ⅝ wave 2 M. mobile whip **$18**
AS-GM gutter clip mount with cable and connectors **$10**
M-RING body mount and cap for 2 M. whips **$5**

CUSH CRAFT ANTENNAS Model DGPA 52 to 27 MHz adjustable ground plane **$25**
LAC-2 lightning arrestors **$6**
Model AR-2 RINGO ⅝ wave verticals **$20**
AR-2X RINGO double ⅝ waves verticals **$35**
ARX-2 extension for AR-2 **$15**
A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each **$60**
A147-11 11 elements 2 M. Yagi **$30**

CRYSTAL FILTERS 9 MHz, similar to FT-200 ones, with carrier crystals **$35**

FDK MULTI-7 2 M. FM transceivers 10 W. output with 12 sets crystals available all 7 repeater and anti-repeater frequencies plus channels 40-50 and 52 simplex **$225**

KEN KP-202 2 M. FM transceivers 2W output with 6 sets crystals **$150**

KYOKUTO 2 M. FM transceivers with digital read-out, synthesized 400-1000 5KHz channels, for repeater and anti-repeater and simplex operation, 12 W output **$300**

ICOM IC-202 2 M. SSB transceivers 144.0 to 144.40 MHz **$185**

KLM ELECTRONICS 12V DC 2 M. amplifiers 12W output **$50**

AUTOMATIC MORSE KEYERS EK-150 with squeeze key paddle built-in AC operated with monitor **$75**

FERRITE CORE BALUNS cheaper Japanese products for up to 500W **$12**

COAX CABLES — CONNECTORS — SWITCHES Amphenol PL 259-SO 239 **$1.25**
3 Position Switch **$8**
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RG-58 U Foam Insulation 3/16" diam. Cable, solid core **35 cents**
RG-58 U Standard Cable **30 cents**
Coax Cable Prices per yard. Add $1 cutting-handling expenses.

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AN AR SPECIAL

A REVIEW OF THE KEN KP 12A RF SPEECH PROCESSOR

Ken products are produced by the Toyomura Electronics Company of Tokyo, Japan. The Ken name has, of course, become famous in Australia through the KP 202 two metre handi-talki. The KP12a RF Speech Processor is distributed by Sideband Electronics Sales and Engineering of Springwood N.S.W.

The Ken unit differs from most other RF processors in that it is a complete single sideband system within itself. That is, the microphone feeds directly into the unit, the signal converts to 10.7 MHz double sideband then passes through a multi pole crystal filter which removes one sideband. The signal is then clipped and filtered and returned to audio via a product detector. The resultant audio is fed back into the normal microphone input of the transmitter or transceiver.

However, before we look at what the Ken can do in practice, a look at the unit itself is in order. Considering the complexity of circuitry it is an extremely compact package. Overall it measures 60 mm high, 130 mm wide and 150 mm deep, with a weight of 1.2 kg. Appearance is most attractive. The front panel is a brushed aluminium finish similar to that seen on much of the current Hi-Fi equipment. The cabinet is a smooth gloss black.

The Ken has a built-in AC power supply and a VU meter to indicate the correct operating point.

The manufacturers quote the following specifications:

Talk Power: Better than 6dB improvement.

Clipping Threshold: Less than 2mV at 1 kHz.

Band Width: 2200 Hz at 6 dB down.

Frequency Response: Approx. 300-3000 Hz at 12 dB down.

Distortion: Less than 3 per cent at 1 kHz with 20 dB clipping.

Output Level: More than 80 mV at 1 kHz.

Input Impedance: 5K ohms.

Output Impedance: 2K ohms.

Power Requirements: 230 volts AC at 2.3 watts.

Semi-conductors: Four transistors, 4 diodes and three IC's.

CIRCUIT DESCRIPTION

The microphone input is via the front panel gain control to a single transistor amplifier. The gain control actually sets the clipping level. Protection is provided against RF feedback affecting this stage. Audio is now fed to a TA7045M IC balanced modulator stage with carrier injection provided by a separate 10.7015 MHz oscillator stage.

This same oscillator is also used as the carrier re-insertion source for the product detector at the other end of the system. The balanced modulator is fed through the six pole 10.7 MHz filter to a TA7061AP IC which provides 69 dB gain and also symmetrically clips the signal. Harmonics of the clipping process are removed with a double tuned passband filter. A second TA7045M operates as the product detector with the audio output going via the output control to the output socket and also to a single transistor stage to drive the level meter. The power supply employs a full wave rectifier feeding a single transistor regulator with 12 volts DC output.

THE KEN KP12a ON TEST

The following figures were obtained using AWA professional audio test equipment.

Firstly the overall frequency response was measured. In relation to 1 kHz there was a gradual roll off to —7 dB at 300 Hz. At the high end, it was level to 2.5 kHz dropping to —10 dB at 3 kHz. At 4 kHz this had dropped to —32 dB. These figures of course meet the specifications with a little to spare. Measurements of the distortion proved interesting with the highest distortion occurring at the point of no clipping. As the clipping was increased to the 20 dB point the distortion dropped to 3.5 per cent from 7.5 per cent. The 20 dB figure only exceeds the specified figure by .5 per cent. Maximum output was 72 mV, a little down on the rated 80 mV but still more than enough to drive the most insensitive microphone input. In relation to the 72 mV output the noise level was —40 dB.

These are excellent figures with even the highest distortion measurements well below the audible point.

THE KP12a ON THE AIR

Our on-air tests were carried out with a Yaesu FT101B. The 101B microphone plugs directly into the KP12a. Although other Japanese transceivers use these same connectors, they are often wired in a different way, so check the wiring diagram first. An output lead to suit the 101B is also supplied.

The power *On/Off* switch of the Ken connects the microphone directly to the transceiver in the *Off* position; however the input circuitry of the clipper is still in parallel with the microphone. This causes a drop in microphone output of about 6 dB. In the case of the 101B this was no problem but may cause difficulties with other transceivers.

With the power switch *On* the meter is illuminated, albeit somewhat on the dull side.

On air reports received varied according to the signal strength at the other end. All stations reported a marked increase in 'talk power'. With very weak signals under poor conditions, use of the unit often made a marginally readable signal 100 per cent copy. Local stations reported no noticeable increase in band width so long as the transmitter was not driven beyond its normal linear operating point. With the high output of the Ken this is easy to do and the use of an oscilloscope is recommended.

CONCLUSION

The use or otherwise of speech processors appears to be very much a matter of opinion. It is not proposed here to say whether you should have one or not. However, this little unit has excellent specifications which are met in every respect. The instruction book is fairly complete with operating instructions, circuit description, internal calibration information, but no printed circuit layout. The AC power cord is only a two wire type with a two pin American plug. It is recommended that this be changed to a three wire cord with suitable plug. ■

NEWCOMERS NOTEBOOK

with

Rodney Champness VK3UG
and David Down VK5HP

NOVICE TRANSMITTER, PART 6, AFTERTHOUGHTS

So far this transmitter has been largely valved. It is possible to use more transistors and even integrated circuits in its circuitry. The valved modulators could easily be replaced by one using a relatively new audio integrated circuit called a TBA810AS, which is capable of producing up to 8 watts of audio with a supply voltage of 18 volts and an output load of 3.5 to 4 ohms. Fig. 1 shows the modulator circuit.

The main suppliers of this IC are *Warburton Franki Pty. Ltd.*, but they are available from a number of distributors in various States. Circuit boards and complete kits are available, but it is suggested that if you do buy an integrated circuit, only buy the board and not the complete kit as the component values which suit its use as a modulator are significantly different, in some instances, from those supplied in the complete kit. With the components as listed the input voltage required to give full output is 80 mV, which means that a low gain preamplifier stage is required to boost the overall gain to a figure suitable for crystal or high impedance dynamic microphones.

It is quite likely that the integrated circuit could be sensitive to the RF energy generated by the RF section of the transmitter so the fitting of C12 and R13 may be most desirable to prevent RF getting into the input of the IC. It also serves the purpose of tailoring the frequency response of the audio into the IC. The input track on the printed board will need to be cut near the IC and R13 bridged across it and C12 wired from the IC input pin 8 to the nearest earth land on the board. These two components will need to be wired on the printed side not on the normal component side.

The preamplifier can be wired on a small piece of veroboard or on a tag strip close to the microphone socket. Any leads that are carrying audio, before it is amplified by the IC, that exceed a couple of inches in length should be run in shielded hookup wire.

The modulation transformer is a normal valve type speaker transformer used back to front. The primary impedance should be 6000 ohms but these are not normally available so either a 5000 or 7000 ohm transformer would be suitable. The secondary impedance is to be 3.5 or 4 ohms. In this modulator the 3.5 ohm winding is the primary, and the 5/7000 ohm winding is the secondary. The green and black wires are the 3.5 ohm winding ends and the blue and red are the 5/7000 ohm winding ends. Red goes to HT and the blue goes to the PA. It is important that the IC modulator has a load at all times otherwise transient spikes will destroy it. The negative cycle loading components D1/R15 are most important to prevent this occurring.

An additional precaution that may well be desirable is to place two zener diodes across the 3.5 ohm winding. These diodes will clip the transients off at a level of 15 volts peak to peak, so protecting the IC.

Using this IC it is possible to upgrade the transmitter to 10 watts output. The red wire from the transformer goes to terminal D of STR1 and the blue wire goes to terminal E of STR1. The DC voltage drop across the modulation transformer T1 should be enough to keep the DC input similar to that on CW, and hence at the 10 watt output level. The maximum supply voltage for this IC is 20 volts but it is inadvisable to exceed 18 and in most cases 16 volts will be sufficient. A regulated 18 volt supply would be most suitable to supply this modulator. An article on the use of this IC in an amplifier appears in *Electronics Australia* for January 1975, and is well worth reading before starting on this modulator. The author has built this audio amplifier but has not used it as a modulator at the time of writing this article.

Switch section S1b can be removed from its previous job by wiring directly from D to STR1 to the junction of the resistor R19 and the relay contact. S1b can then be used to switch DC supply voltage to the modulator on AM and remove it from the modulator on CW.

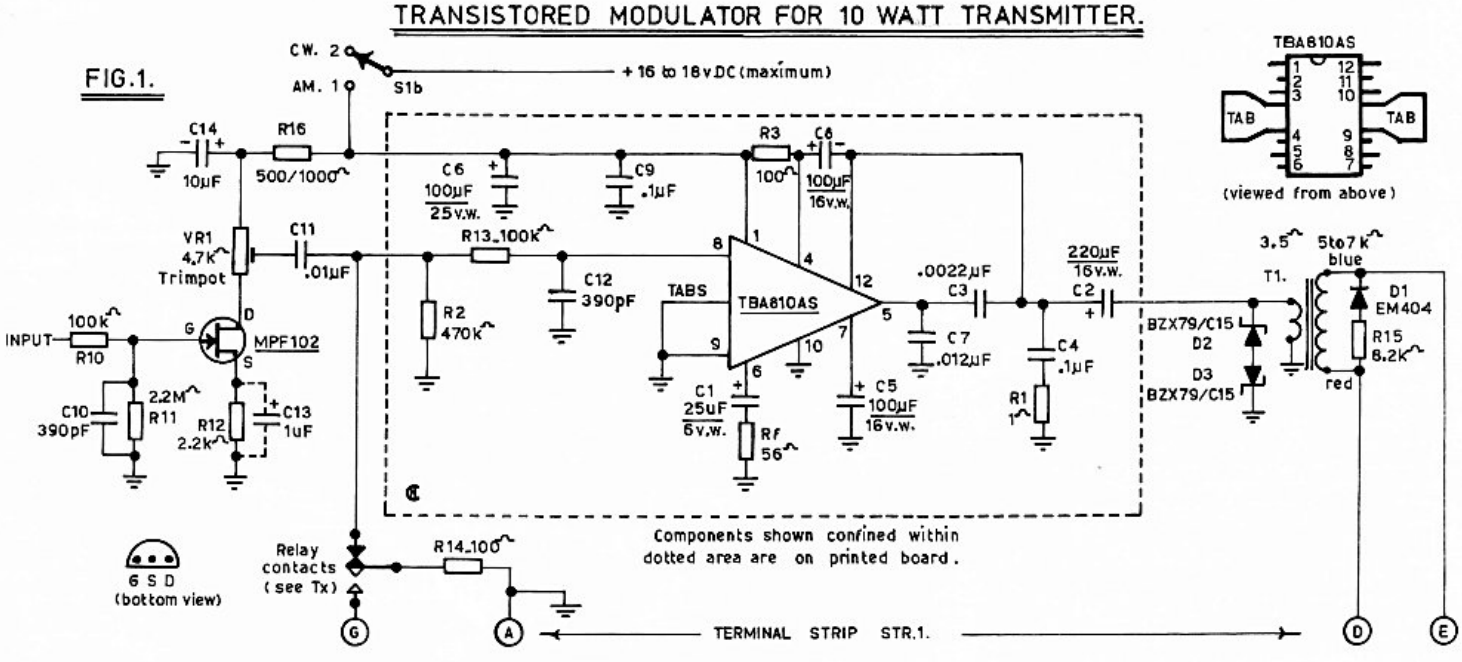
The gain of the modulator may not be sufficient so C13, shown dotted in, can be fitted to increase the preamplifier gain. R12 can be a small carbon preset trim pot. R12 is adjusted in value until the drain of the MPF102 or similar is at half rail voltage or a little higher.

USING THE NOVICE TRANSMITTER ON 160 METRES

It is an extremely simple task to put the transmitter on 160 metres. It involves changing the tank coil L1 and increasing the values of C9 and C10/11. L1 is altered to 36 turns on a 1¼ inch diameter by 1¼ inch winding length which gives about 28 uH inductance. C9 is nominally 320 pF and is within the capacity range of the normal BC tuning capacitor originally used. An additional 600 pF is needed across C10/11 to bring the total capacity to about 2200 pF. The transmitter tunes well on this band and it has been found that the harmonic and spurious energy is extremely low at —45 dB in relationship to the carrier

TRANSISTORED MODULATOR FOR 10 WATT TRANSMITTER.

FIG.1.



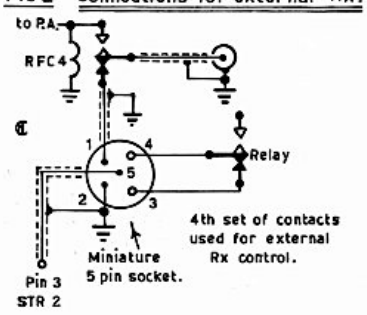
output. The transmitter could no doubt be put on 40 metres but the author believes that the limitations of crystal control on this band may not make it worthwhile when competing with strong commercial stations.

USING THE NOVICE TRANSMITTER (TRANSCEIVER) WITH A SEPARATE RECEIVER

The complete unit has been designed as a transceiver, but it was decided that the transmitter should be able to work with an external receiver. This is quite easily accomplished. A small 5 pin socket is fitted on the rear apron of the chassis not too far from the relay. The wiring of this socket is shown in Fig 2 and is self explanatory. When the internal receiver is to be used a shorting plug with pins 1 and 5 of the wired together is inserted so that the internal receiver has the aerial connected to it. You may remember that the relay specified had 4 sets of change over contacts and that only 3 were used. The fourth set is used for controlling the external receiver.

This is the completion of the description of the 80 metre 10 watt Novice Transmitter. It is hoped that its description has been of assistance with your studies and that if you build it that you find it works as well for you as the author. The description of the receiver will follow in due course.

FIG 2 Connections for external Rx.



EXAMINATIONS

Exams again this month — some people will pass and some fail. A few tips.

(1) Read the questions carefully, and mark which to you are the easiest to answer in descending order.

(2) Allot yourself an equal amount of time per question, with some extra time to revise your answers after you have finished the paper.

(3) Do not exceed this allotted time if possible.

(4) Do not answer more than the required number of questions.

(5) Keep your answers concise, complete and correct.

(6) Keep strictly to the question; do not deviate onto some related subject in the hope that it will get you more marks — it won't.

(7) Do not write a page of waffle in the hope the examiner will understand what you are trying to say. A paragraph of good information is much better than a page of mediocre garbage.

(8) Write or print *LEGIBLY*, the examiners are not mind readers. If the examiner misinterprets your meaning through bad writing you will lose marks and possibly fail.

(9) Draw your diagrams *NEATLY*, plan them so that you do not run out of paper on the right side of the sheet. Make sure that your circuit diagrams are accurate and could possibly work.

(10) If circuit diagrams are required, draw them; if block diagrams are required, draw block diagrams. There is a very real difference.

(11) Keep cool, calm and collected in the exam — easier said than done of course.

(12) If you fail in the exam do not blame the examiner too much, it just could be that you do not know your work as well as you think.

Best of luck with the exam later this month. ■

IARU NEWS

Article 5 of the ITU Regulations deals with frequency allocations and begins with clause 125 which reads, "For the allocation of frequencies the world has been subdivided into three Regions. These are then delineated. In these articles they are abbreviated to R1 (roughly Europe and Africa), R2 (the Americas) and R3 (the rest).

In the frequency boxes published by the ITU services with names printed in small capitals are the primary services, services with names printed in italics are secondary services and those printed in "grotesque light" are permitted services. Permitted and primary services have equal rights except that in the preparation of frequency plans the primary service, when compared with the permitted service, has prior choice of frequencies.

Stations of a secondary service shall not cause harmful interference to stations of primary or permitted services to which frequencies are already assigned or to which frequencies may be assigned at a later date. Stations of a secondary service cannot claim protection from harmful interference from stations of a primary or permitted service to which frequencies are already assigned or may be assigned at a later date. Stations of a secondary service can claim protection however from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

Then follow a number of explanations of footnote definitions, such as 'additional services' and 'alternative allocations' describing the priorities of these services. However article 6 sets out special rules, which do have limited scope, for special circumstances affecting the use of frequencies but there are 'let-outs' in articles 3 and 4 which will be looked at later on.

The table of frequency allocations extends from 10 kHz to 275 GHz. No allocations have been made below and above these limits, but any administration authorising the use of frequencies below 10 kHz for special national purposes must ensure that no harmful interference is caused thereby to the services above 10 kHz.

The allocations to services is set out for each of the three ITU World Regions. Some of the frequency bands are very narrow, others quite wide. Numerous exceptions to most of the allocations are set out in footnotes which, in the main, apply in specific countries.

The first amateur allocation is the 160 m band. In R1 there is no amateur allocation but in 9 European and 3 African countries administrations may allocate up to 200 kHz to their amateurs (subject to non-interference to 'other' services in other countries; and with a mean power not exceeding 10 W) within the band 1715 to 2000 kHz. In R2 and R3 1800 to 2000 kHz is allocated to Amateur, Fixed, Mobile (except aero mobile) and Radio navigation, all as primary services. In this band in R2 Loran has priority and in R3 other services in this band must not cause harmful interference to the Loran system on 1850 or 1950 kHz (each extends 25 kHz both sides of centre). In the Australian tables (issued by the PMG's Dept. Feb. 1974) the amateur service allocation is only 1800 to 1860 kHz as a secondary service to Radionavigation (Loran) and is based — as so many Australian exceptions are based — on the Report on the Third and Final Stage of the Work of the Frequency Allocation (Space Service) Committee.

The next amateur band — 80 m — extends from 3500 to 3800 kHz in R1 (shared with Fixed and Mobile except aero mobile), 3500 to 4000 in R2 (shared as for R1) and 3500 to 3900 in R3 (shared with Fixed and Mobile). In Australia 3500-3700 kHz is allocated exclusively to the amateur service and 3700-3900 kHz to fixed and mobile services. In India 3890-3900 kHz is the amateur allocation.

In all Regions 7000-7100 kHz is allocated to the Amateur and Amateur Satellite services, shared. In R1 and R3 7100-7300 kHz is allocated to Broadcasting but in ZS land 7100-7150 kHz is allocated to the amateur service. In the Australian tables 7100-7150 is allocated to Broadcasting as the primary service and amateurs as the secondary service with 7150-7300 being Broadcasting alone. There is a Special Resolution (No. 10) from WARC 1959 about the 7000-7300 kHz band which resolved that the broadcasting service should be prohibited from the band 7000-7100 kHz and that BC stations operating in this band should cease operations. A further resolution was to the effect that inter-Regional amateur contacts should be only in the band 7000-7100 kHz and that Administrations should make every effort to ensure that the broadcasting service in the band 7100-7300 kHz in R1 and R3 does not cause interference to the amateur service in R2.

There is a Recommendation from WARC 1959 which recognises the urgent need to reduce the pressure on Band 7 (3 to 30 MHz) and recommends administrations to adopt new techniques and recognises the benefits of using higher frequencies, etc.

The 20 m band at least seems clearer. 14,000 to 14250 kHz is allocated to Amateur and Amateur Satellite and 14250-14350 kHz amateur only in all Regions. In USSR 14250-14350 kHz is also allocated to the fixed service.

On 15 m 21000 to 21450 kHz is allocated for Amateur and Amateur Satellite in all Regions. No footnotes for a change.

On 11 m 26100 to 27500 kHz is allocated in all Regions to the Fixed and Mobile (except aero mobile) services but in R2, Australia and New Zealand the amateur service may operate between 26960 and 27230 kHz 27120 $\pm$0.6% is for IMS; other services must accept any IMS harmful interference.

28.0 to 29.7 MHz is allocated in all Regions to Amateur and Amateur Satellite. More data next time.

It was interesting to note the RI HF band plan published in RI News Sept. '75. The CW only segments are shown as 3.5-3.6, 7-7.04, 14-14.1, 21-21.15 and 28-28.2. The CW and phone segments are 3.6-3.8, 7.04-7.1, 14.1-14.35, 21.15-21.45 and 28.2-29.7. RTTY frequencies are 3.6 $\pm$20 kHz, 7.04 $\pm$5, 14.09 $\pm$10, 21.1 $\pm$20 and 28.1 $\pm$50. SSTV recommended frequencies are 3735, 7040, 14230, 21340, 28670 all $\pm$5 kHz. Recommended beacon frequency band 28.2 to 28.25 MHz. Downlink recommended for amateur satellites 29.4 to 29.500 MHz. Reserved frequencies for inter-continental contacts are 3.5-3.51 and 3.79-3.80 (3.635-3.65 in USSR).

The Australian 'gentleman's agreement' CW only segments are 3.5-3.535, 7-7.03, 14.0-14.1, 21.0-21.15 and 28.0-28.2 with RTTY on 3.62, 7.04, 14.09 and 21.09.

A further item in this issue of RI news is the Japanese prefectures or territories prefixes. JA1 covers Tokyo, Kanagawa, Chiba, Saitama, Ibaraki,

Tochigi, Gumma and Yamanashi. JA2 (Nagoya area) — Shizuoka, Gifu, Aichi and Mie. JA3 (Osaka area) — Kyoto, Shiga, Nara, Osaka, Wakayama and Hyogo. JA4 (Hiroshima area) — Okayama, Shimane, Yamaguchi, Tottori and Hiroshima. JA5 (Shikoku Is.) — Kagawa, Tokushima, Ehime, and Kochi. JA6 (Kyushu Is.) — Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki and Kagoshima. JA7 (Sendai area) — Aomori, Iwate, Akita, Yamagata, Miyagi and Fukushima. JA8 — Hokkaido Is. JA9 (W. Central Honshu) — Toyama, Fukui and Ishikawa. JA0 — Niigata and Nagano. JD1 — Ogasawara Islands including Kazan Islands (formerly Bonin and Volcano Islands) and Minami Torishima Is. (formerly Marcus Is.). JR6 — Okinawa only. Other prefixes following after JA are JE, JF, JG, JH, JI and JR. 8J1AA — Jap. Antarctic Expedition. Club stations have 3-letter suffixes in the YAA-YZZ and ZAA-ZZZ series. ■

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	**VKOMA, Mawson**	**53.100**
	VKOGR, Casey	**53.200**
VK1	**VK1RTA, Canberra**	**144.475**
VK2	**VK2WI, Sydney**	**52.450**
	VK2WI, Sydney	**144.010**
VK3	**VK3RTG, Vermont**	**144.700**
VK4	**VK4RTL, Townsville**	**52.600**
	VK4RTT, Mt. Mowbullan	**144.400**
VK5	**VK5VF, Mt. Lofty**	**53.000**
	VK5VF, Mt. Lofty	**144.800**
VK6	**VK6RTV, Perth**	**52.300**
	VK6RTU, Kalgoorlie	**52.350**
	VK6RTW, Albany	**52.950**
	VK6RTW, Albany	**144.500**
	VK6RTV, Perth	**145.000**
VK7	**St. Leonard's**	**52.400**
	VK7RTX, Devonport	**144.900**
3D	**3D3AA, Suva, Fiji**	**52.500**
JA	**JD1YAA, Japan**	**50.110**
VE	**VE1ATN, Canada**	**50.056**
KG6	**KG6JDX, Guam**	**50.105**
	KG6APP, Guam	**50.150**
	K2IRT/KG6, Guam	**50.098**
ZL1	**ZL1VHF, Auckland**	**145.100**
ZL2	**ZL2VHP Palmerston North***	**52.500**
	ZL2VHF, Wellington	**145.200**
	ZL2VHP, Palmerston North	**145.250**
	ZL2VHP, Palmerston North	**431.850**
ZL3	**ZL3VHF, Christchurch**	**145.300**
ZL4	**ZL4VHF, Dunedin**	**145.400**

*** Denotes change of location from previous listing.**

A note has come from Selwyn ZL2BJO advising of a change of location for their 6 metre beacon ZL2VHP on 52.500 from Mt. Stewart to Palmerston North. He also advises the FSK keying has been changed to +ve, which should be more generally acceptable.

LETTERS RECEIVED

Claud VK4UX writes from Rockhampton outlining the extent of activity in that region. He lists no fewer than 13 stations active on 6 metres, mostly using SSB, and 18 on 2 metres FM. It is well known that Rockhampton to VK5 is an ideal distance and ensures many 6 metre contacts. However, the real concern is for two metres, and the fact that there are 18 operational even if on FM indicates a chance for contacts on the 2 metre band if conditions permit.

Claud reports a good opening via Ch. 40 and 50 to Mackay, about 300 km north on 21/11 and 22/11 with very strong signals, with a repeat of conditions on 23/11. The Rockhampton repeater is well on the way, and will probably operate on repeater Ch. 1. Those of us in the South hope that the FM boys are beginning to realise they can work further than across town in North Queensland, and that this will lead to reasonable sized rotatable beams which can be pointed South. Further we would hope this same activity leads to an increased usage of 144 MHz SSB with horizontal polarisation.

The first mention of any JA signals for some time is contained in Claud's letter on 12/10 at 0419 to 0426, a short opening occurred and he worked JA0AGA, JA1RDW and JA1PLI. A seven minute opening! At 0634 JH1 GUL called CQ, and after a quick QSO he faded out also.

From the Wagga District Radio Club, Publicity Officer Frank VK2ZBG writes to say there is no 6 metre activity in Wagga due to Channel 0, but there are indications low power FM might be tried to see what happens. Most of their activity therefore is confined to 2 metres FM using their repeater on Ch. 2, but probably shifting to Ch. 5 around New Year's Day to overcome interference to Ch. 2 repeater in Bendigo by the Murray Valley operators trying to work through Wagga.

The equipment consists of a 1677 base station, suitably converted mostly by Doug VK2ZMP and Sid VK2SW, and located on Mt. Flackney, 17 Km S.E. of Wagga and 550 m. a.s.l. Contacts can be made up to about 170 km and about half that using mobiles.

The Club holds Ch. 40 foxhunts frequently, and there are 6 active members on 2 metres, and 6 more somewhat less active.

So it looks as though Wagga is another area of 2 metre operation to keep in mind, but for direct contacts it will still be a prime requirement for both sides of any DX contact to run reasonable power and a good antenna for all except an occasional outstanding Es type contact. Long haul DX still cannot be undertaken with any reliability unless the above requirements are met, plus correct polarization at both ends.

John VK4UI included a short note with the news from the Gold Coast Radio Club to say there will be quite a few up there with beams pointing South and operating SSB on 144.1. Excellent, chaps, may the good word spread to other camps and get SSB operating for best results. John mentions contacting C21KM/maritime mobile via the Gold Coast Repeater while he was about 250 Km out to sea heading for Nauru! Just goes to show what you can work if you are around.

Steve VK3ZAZ sends along two interesting letters, and a number of items contained therein are worth passing on. As an indicator of how the 6 metre DX fared at the start of the "season", he worked on 30/11 2340 P29GR, 2341 P29MJ, 0011 P29GA, 0017 VK6BV, 0041 P29DJ, 0053 heard 3D2AA on 50.100, 0059 VK4ZIT hearing ZK1AA, 0130 VK6 Kalgoorlie, 0159 VK6ZBW Perth worked, 0300 VK8ZGF heard.

On 29/11 too many stations to mention, but Steve comments on the increased strength of backscatter signals this year. This same event has been noted here. Of interest to everyone is VK9ZNG on Norfolk Island who has just become licensed and operates intermittently during the week, and on Saturdays, but not much Sunday due to his work. He uses a long wire antenna and has been worked by several stations in VK5. Apparently he schedules C21DC 1900Z daily on 52.005.

14/12 . . . what a fantastic day for DX, Steve worked over 100 stations, including the P29's twice in 3 hours, and that's good going. Back scatter extremely good, and by that method worked Kerry VK5SU on a round trip approx. 3500 Km for a 1200 Km direct distance! From 7/12 to 12/12 he worked ZL's every night, with several new call signs, including ZL2ARW, ZL2CD and ZL2BGE. VK6BV and VK6ZGQ worked ZL2ARW and ZL3QK on 7/12 a distance of about 5000 Km. Good going.

Further on in Steve's letter are a couple of interesting comments which I include as follows: "If every station who could operate 400 watts PEP did, on a wide open band, then it would be bedlam. Pity about the VK4 who did just that on Saturday 31-12 all day. When the DX started to fade out he went back to low power (20 W) and was still 20 dB over S9! Bit late then! There is more than 100 kHz on the 6 metre band! (Give it a thought chaps, if you're guilty, think of others, it's nice to be told you are the strongest signal on the band, but the other bloke should also add you are using most of the area too . . . 5LP).

The other comment Steve makes is: "If a station is calling CQ DX Pacific, he is obviously doing it for a reason. The timing is critical for long haul DX, so locals, i.e. VK Sporadic E DX 20 dB over 9 types, please give courtesy to that station and allow him to work that mode. There will be adequate time to contact these people during the summer months and it is proven that long haul DX only appears October-November and March-April, with slight exceptions. Apart from the poor operating technique, breaking in on a station with a "rock crusher" signal when the station has all the RF gain controls flat out for weak signals, is rather rude to say the least!" (Fair comment, I shouldn't need to add more . . . 5LP).

SIX METRES

We seem to be hammering 6 metres this month, but I guess it is the right time to hammer it. Up to the time of writing (18/12) there have certainly been some fantastic openings, and with the ever increasing use of SSB, stations are being copied almost down into the noise, which seems to give further proof that 6 metres never ever really closes, only the operators do! From my own observations here, up to now the increased number of P29 contacts has proved interesting, also that VK9ZNG on Norfolk Is. is available, plus Geoff VK8ZGF in Alice Springs, and a report that VK8ZCU is said to be active in Darwin. ZL's have been scarce into VK5 so far, though readily available into VK3 and 7. VK6's have been very active and putting out some extremely strong signals through my 30 dB hill!

TWO METRES

I am extremely thrilled to hear of all the new SSB equipment being put on the air, either by home building or commercial.

It has been one of my favourite hobby horses to keep pushing SSB on 2, and results seem to be visible. Both Keith VK5SV and David VK5KK, a father and son team, are doing their share to keep the low end of 2 active. I have spent quite a lot of time there too, also Peter VK5ZPS, Peter VK5ZPW, Clarrie VK5NA, Col VK5RO, Jim VK5ZMJ (Pt. Pirie), and of course that solid gang of enthusiasts around Mt. Gambier, Chris VK5MC, Colin VK5DK, Trevor VK5NC, Trevor VK5TH, David VK5ZOO, Robin VK5TN, Ben VK5RD and others. So that's quite a good start from this way. I tried on two nights to make contact with Fred VK3AZG in Melbourne without success, although I could hear him when he worked Mt. Gambier. Strange. Then of course there are the stations we hear on the Ch. 1 repeater on Mt. William.

I am still hopeful Saturday and Sunday 20/12 and 21/12 will be good 2 metre Es days, with signals from VK2 and VK4 available to VK5 and VK3 and vice-versa. The VK6 boys in Albany are well set up for 2 metres SSB this year, and February could again be a good month in which to work them, 30 dB hill permitting! Geoff VK8ZGF is also set up for 2 metres SSB; what a scramble there will be if he comes through!

30/11 was a good night for fine 2 metre signals to Mt. Gambier from Adelaide and surrounding areas, and from Mt. Gambier to Melbourne. Noted also since then Mt. Gambier has been working VK7 on 2 metres, so there! 27/11 saw contact between VK3YSL and VK2ZAY on 144.1 which was a good QSO.

On 26/11 I was copying Ch. 5A television from Wollongong the best ever here at my QTH, and only the third time ever. During the course of my work I noted at some time of the middle part of that day that it was possible for all television channels on the channel selector to be active, and many channels had more than one signal. Ch. 2 Adelaide swamped by Ch. 2 Brisbane, three North Queensland channels on Ch. 3, and Ch. 10 Adelaide was being interfered with by another Ch. 10, and that's getting very high in frequency, up to 215 MHz. So anyone with a rotator on their TV antenna and living out in the sticks could have a real ball on such days.

MOONBOUNCE REPORT

From Lyle VK2ALU comes the monthly report that a new 432 MHz preamplifier was made up and installed in the feed box in time for the WA6LET tests on 22/1. The noise figure improvement of 0.3 dB probably helped a little to hear them 18 dB above the noise. The signal report back to VK2AMW for their contact was 559, which was very gratifying. An input isolating relay then developed high contact resistance and terminated this test, but repairs were made for the next scheduled tests on 29/11, with ZE5JJ, but who later advised being unable to get on due to heavy rain. SM5LE was not heard. However, JA1VDV

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Prices include S.T. Allow 50c per $100 insurance, min. 50c. Freight or postage $4.00. Prices and specifications subject to change.

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was heard again, 8 db above noise. The VK2AMW echoes were the loudest ever, peaking at one time to 12 dB above noise and averaging more than 6 dB over.

WA6LET was apparently heard by Les VK3ZUR using a single loop yagi 18 to 20 feet long, while Chris VK5MC heard them on his 4 x 13 element yagis. I was only able to use one 13 el. yagi which seemed at best to give me the barest of a signal on two occasions from WA6LET, but so poor as to be virtually unintelligible on the tape recorder, but a little better in the phones. However, there will be other days!

VK5 FIELD DAY

This event was quite well supported this year, stations out in the field on 6/12 and 7/12 being VK5AD/P, VK5ZPP/P, VK5NA/P, VK5ZPW/P, VK5SV/P, VK5BW/P, VK5KK/P, VK5TV/P, VK5ZCF/P and VK5LP/P. That's not a bad line up for this State. Conditions were generally good, with fine weather and a warm night, most operators had the company of plenty of moths, ants, various insects and mosquitoes, but I found the combination of fly spray and insect repellant kept things within bounds. Although I was a lone operator on Checker's Hill, not far from the home QTH, I had a great time and ran up 190 contacts in 12 hours 17 minutes actual operating time which I guess is not too bad for a VHF contest. 6 metres opened to VK2, 3, 4 and 6, with the VK6's sending over the very strong signals.

Most portable stations were operating 6 and 2 metre SSB, 2 metres FM, and I had one cross-band contact on 432 MHz! Much of the general operating seemed to be confined to SSB, particularly on 2 metres which was surprising, but of course this mode carried bonus points which no doubt helped. All in all, a very good contest, and one which I hope will receive further support next year; perhaps the VK3's might think about running a parallel contest, from some of their good mountain tops.

Finally, I notice in the VHF notes in "Q.R.M." by Joe VK7ZGJ that on Saturday 22/11 ZL TV was watchable in colour for about 3 hours, with QSB, but no sign of their beacon. ZL4LV was worked by Kevin VK7ZAH and Joe VK7ZGJ. No sign of any other ZL stations.

I guess that will have to do for this month. There is just so much that could be written about 6 metres that you already know if on that band, and with the time lag at this period of the year with these notes, the news has long since become stale.

Anyway, remember to keep an ear to the ground for possible long haul DX during March and April, and when listening, don't forget to do some calling, the guy at the other end might only be listening too!

The thought for the month: "This evening is the end of today unless tomorrow is a holiday — in which case tonight is the beginning of tomorrow"

The Voice in the Hills. ■

MAGAZINE INDEX

with Syd Clark, VK3ASC

BREAK IN October 1975
Component Lead Shaper; Plessey SSB Transceiver; A Direct Conversion Receiver; SWR and Feedlines; A 6 Metre Transverter for the FT101; A Dummy Load with Frequency Dependent Metering; A Double Conversion Receiver for the Wellington Walkie.

CQ-TV
A Digital Scan Converter for Colour Slow Scan Television; Slow Scan, Where is it Going; A Video Modulator; An Amateur Tripod; A BATC Test Card; BATC Equipment Register.

HAM RADIO September 1975
Inductively-Tuned Six Metre Kilowatt; Tunable Notch Filter; Optimizing the Phase-Locked Loop RTTY Terminal Unit; Toroidal Coil Inductance; Single-Sideband Speech Splatter — Its Causes and cure; 100 watt Solid-State Power Amplifier for 432 MHz; Hand-Held Touch Tone; How to Use Meters; Magnet Mount for VHF Mobile Antenna; 300 Hz Crystal Filter for Collins Receivers.

MOBILE NEWS Sept./Oct. 1975
Amateur Transmitter Specifications; Automatic Tone Burst for the Trio TS-700; Motor-Cycle Mobile Installation; Mobile Operation in Germany; Mobile 2 Metres in Brittany; Conversion of Single Channel Pye AM25B to Multi-Channel Operation.

SHORT WAVE MAGAZINE August 1975
Going QRP On Eighty; DX from EDAY Is, Orkney; Noise Bridge for Antenna Measurements; Ten Metre Aerial Amplifier; Cheap RF Output Meter.

September 1975
Five Watts on Forty; Frequency Modulator for VHF Transmitters; Half Size Quad for Twenty; Checking FM Deviation.

RADIO COMMUNICATION September 1975
NFD 1975; Subjective Selectivity and Stereocode; 2M SSB Transmitter Using the FR400SDX VFO; GB3IOW — A 10 GHz Beacon; A Teleprinter Message Generator; Usual features and 1970-1974 Index.

RADIO ZS September 1975
The QTC Saga; Steurnisfilter (LIne filter); The Mobile Amateur (On a Combine Harvester). So much of this journal is now in Afrikaans and unreadable by me. ■

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Crafers, SA 5152

THE MAPLE LEAF AWARD

The award consists of two parts:
1. an attractive flag parchment diploma, suitable for display in anyone's radio shack and
2. a Canadian Maple Leaf flag lapel pin, suitable for wearing.

The Maple Leaf Award is for working or hearing, and confirming Canadian amateur radio prefixes as authorised by the Department of Communications for Canada.

QSLs must be in your possession. A GCR (Certified List) must accompany your application. QSLs should not be sent unless specifically requested.

Class III, 15 different Canadian prefixes.
Class II, 25 different Canadian prefixes.
Class I, 30 or more Canadian prefixes.

A special plaque award will be issued free of charge to any radio amateur who works and confirms 50 or more different Canadian amateur radio prefixes.

All contacts for all classes must be made after January 1st, 1965, the year in which the Maple Leaf became the country's official flag.

Application, GCR and 10 IRCs or $1.50 or equivalent in any foreign currency should be sent to the awards custodian:

Mr. Garry V. Hammond,
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Prefixes can come from the CF, CG, CH, CI, CY, CZ, VA, VB, VC, VD, VE, VF, VG, VO, VX, VY, XJ, XK, XL, XM, XN, XO, 3B, 3C, and any other special allocations.

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Contacts made on any band and mode will count since 1st January 1971.

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The award is granted to qualified applicants free of charge.

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EA3DU EJ EK FP GR GT HK HL HU IP JE JR KF KT KZ LQ MS MT MY MZ NB NE OM OY PN QK QZ RC SG SH SI SS TK TN TQ TZ UB UC UH UJ UQ UT UV UZ VA VC.

DIPLOME DUE DEPARTMENT 35 (DD-35) CHC
The Department 35 (Ille-et-Vilaine) of France issues the DD-35 Award to all licensed amateurs or SWLs of the world who submit proof of contacts with 5 stations located in this department using any mode of transmission.

Two classes: HF bands and VHF bands. Endorsement stickers are available for 10, 15 and 20 stations contacted.

QSL cards need not be submitted provided a list of claimed contacts, certified by 2 other amateurs or an Official Club is submitted. The fee is 8 IRCs.

Address for the application:
Jean-Yves Rioult, F5JU
11, square de Provence
35 — Rennes, France. ■

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

February
7/8 ARRL DX Phone
14/15 John Moyle Field Day
14/15 10-10 Net QSO Party
21/22 ARRL DX CW
21/22 YL-OM Phone
28/29 French Phone

March
6/7 ARRL DX Phone
6/7 YL-OM CW
20/21 ARRL DX CW
27/28 CQ WW WPX SSB
27/29 BARTG Spring RTTY

April
24/25 VERON Netherlands
24/25 Bermuda Phone

May
1/2 Helvetia
8/9 Bermuda CW

TEN-TEN NET QSO PARTY
0001 GMT Feb. 14 — 2400 Sunday, Feb. 15.

10 metres only, any mode, one contact only with same station. Exchange name and QTH. Awards to members of net only. For membership write and send log to K5MRU, Grace Dunlap, Box 445, La Feria, USA, TX 78559.

BARTG SPRING RTTY
0200 GMT, Mar. 27 to 0200 GMT, Mar. 29.
Send SAE to FCM for details.

YL-OM CONTEST
Phone: Feb. 21-22. C.W.: Mar. 6-7
Starts: 1800 GMT Saturday.
Ends: 1800 GMT Sunday

The YL's work the OM's in this one. All bands may be used but cross-band or Net contacts do not count.

Exchange: QSO No., RS(T) and ARRL section or country.

Scoring: One point per QSO. Multiply total by number of ARRL sections and countries worked for final score. The same station may be worked once only regardless of band.

There is also a power multiplier of 1.25 for stations running 150 watts or less input. (300 watts PEP if on SSB). Multiply your final score by above factor.

Phone and CW are separate contests and require separate logs.

Awards: Certificates to the highest scoring YL and OM in each country.

Logs must be received no later than April 18th. This year they go to: Beth Newlin, WA7FFG, 826 W. Prince Rd. -06, Tucson, Ariz. 85705. ■

COMMONWEALTH CONTEST 1976

This is the new name for the old BERU for which, apart from the name, nothing in the contest rules is changed.

Following on requests from last year's entrants (112 submitted entries including 26 from VK) the HF Contests Committee of the RSGB agreed to the contest's continuance under exactly the same rules as the BERU with only an updating of the name, aimed at attracting more support from 'newer' Commonwealth countries.

TIME
From 1200 GMT Saturday, 13th March.

To 1200 GMT Saturday, 14th March.
Mode CW only 3.5 to 28 MC.

Eligible entrants are radio amateurs licensed to operate in British Commonwealth call areas. VK1-8; Lord Howe VK2; Willis VK4; Christmas VK9; Cocos VK9; Norfolk VK9; Heard VK0; Macquarie VK0; and Australian Antarctica are all separate contest areas. P29 is now a single area.

Two Trophies have been presented for competition between VK stations — a silver medallion for the highest VK scorer in the official RSGB results, and a bronze medallion for a middle placed VK scorer based on total VK entries divided by two i.e. for 26 entries, to 13th placing; for 33 entries, to 17th placing. Overall winner in 1975 was VE3BMV and only 60 points separated the first four, VE, G, VE, G. VK3MR, placed 16th overall, and VK7RY, 81st, won the 1975 medallions.

Scoring: 5 points for contest exchange, plus 20 bonus points for 1st, 2nd and 3rd contact with each call area other than one's own (there are 111 in all, with G, GW, GC etc. counting as a single area) — exotic prefixes are the rule rather than the exception.

Logs: Separate logs are required for each band showing columns — 1. Date and time GMT; 2. Station worked; 3. Nr sent; 4. Nr received; 5. Band; 6. Leave blank; 7. Contact points claimed; 8. Bonus points.

Each band log should be separately totalled and should include at the end, a check list of all as worked on the band. Separate band totals should be added together and the total claimed score entered on a cover sheet giving particulars of station, QTH, equipment, power, and a declaration that the rules and spirit of the contest have been observed.

Entries may be single or multi-band. Single band entries should claim contacts on one band only, but submit details of contacts on other bands for checking purposes only. Entries should be addressed to — D. J. Andrews G3MXJ, 18 Downsview Crescent, Uckfield, Sussex, England. Closing date 17th May, 1976 (by airmail, please). ■

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers

The Editor,
Dear Sir,

QRP IS ALIVE AND WELL!

The purpose of this letter is to kindle some more interest in the low power field, as well as eliciting information from other QRP operators as to what they are up to and with what results.

Recent QRP/QRP QSO's from this QTH, include [illegible]rrie ZL2PV, Jim VK2BBO using a G5RV and [illegible]-7, Snow VK3MR with his 1 watt rig, Drew VK3XU winding down to 500 milliwatts, John VK2LM with his 15 watts and Vee, and Yoshi JH1RUF sporting 10 watts to a 2 element beam. These QSO's were from 40 and 20 metres and all CW.

The author has been experimenting with 40/20 metre directional antennas in order to come up with an effective QRP station, and the list includes 4 element fixed beam, 40/20 X-beam, 40/20m quad and X-Q quad. The CQ WW DX CW contest was worked with the 3 watts into the 4 el beam, and resulted in 190 QSO's, 20 zones, 23 countries and a lot of fun, all on 20 and all CW.

Quickest QSLers as I see them are, W0IPU, VK5XD, VK5BS, KV4AA, VK4NL and VE3EWY.

Best 20m DX worked so far — A9XU, YV5AE and ZS6ME to complete the QRP WAC, and HZ1AB.

The old 5763 rig is due for mothballs shortly, as the belated Christmas present, an HW7, is due any day.

Hope to hear from other "Fleapower Men" either by Mail, QSO or on the CWN Sunday Mornings. Till then, best DX and vy 73s.

David S. Down VK5HP/QRP. ■

Dear Sir,

The article by Alan Shawsmith, "The Golden Years of AR in VK" (AR Dec., 1975) might have been interesting and more convincing had he taken the trouble to check his facts.

It was not to Charles Maclurcan A2CM, that the honour of making either the first VK-W or the first VK-Europe contact went. That honour belongs to Max Howden, then A3BQ, now VK3BQ and still active on the amateur bands. On Monday, 3rd November, 1924, just after 1900 EAST, Max worked U6AHP (not 6EKY) — see, for example, "Radio in Australia and New Zealand" Vol. 2, No. 45, 10th December, 1924 — and it was Max who wrote in this magazine, "I did my best to answer him, and he certainly managed to read me, although local 'hams' say they never heard such fearful sending. I admit my hand acquired a double phase vibration in place of the usual single, but it couldn't have been too bad". In the 26th November issue of the above magazine, Maclurcan wrote: "Congratulations to 3BQ for being the first Aussie to work U.S.A. 2CM had hopes, but it was not to be".

On Friday, 14th November, at 0500 EAST Max worked G2OD to obtain the double — first to America and first to Europe. The wavelength used for these contacts was about 85 metres.

Maclurcan, who certainly contributed greatly to amateur radio through the 20's **was** the first Australian to contact England on 20 metres. This was on Saturday, 2nd May, 1925, and G2OD was the other station (see, for example, Radio in Australia and New Zealand, Vol. 3, No. 59, 24th June, 1925).

What Shakespeare wrote was "All the world's a stage, and all the men and women merely players" (As You Like It, Act 2, Scene 7). Pedantic perhaps, but weren't we taught that if inverted commas are used, i.e. the writer is quoting, then the original words must be used and not a paraphrase of them. A careful reading of the story of Nebuchadnezzar as given in Kings, Chronicles, Daniel and Jeremiah fails to reveal anything about "scales". Was Alan thinking about that famous king's son, Belshazzar, at whose feast the mysterious hand wrote on the wall "Mene Mene Tekel Upharsin" (Numbered, numbered, weighted and divided) Tekel being interpreted in more detail as "thou art weighed in the balances and art found wanting". Let us hope that this will not be the fate of amateur radio!

By all means let us remember the past, and the exploits of the men who laid the foundations of amateur radio, but for goodness sake let us have the facts, which may be found in the documents of the time, and not woolly memories which only serve to create confusion.

Yours sincerely,
F. K. McTaggart VK3NW/2BNW ■

Dear Sir,

I am interested in using a Parametric Amplifier on 146 MHz and due to my difficulties experienced in obtaining the information required, I would be grateful if one of your readers could assist me.

Yours faithfully,
Gary Stern VK2ZBB,
C/o P.O. Box, 330,
Hurstville, N.S.W. 2226. ■

Trade Review

NEW TRANSFORMER

Ferguson Transformers P/L. have provided a sample of their new PL50/60VA transformer, a recent addition to their 'low profile' range. This small (10 cm x 6 cm x 5 cm) transformer, which looks somewhat like a 'fluro' ballast choke, has two windings of 25 volts, topped at 20 volts and rated at 1.2 amps each.

With the two windings in series the off-load voltage of 57V AC only fell to 53V AC at full load.

Connections are made via round 'quick connects' and six 30 cm coloured leads are provided with one end tinned and a connector on the other. A 10 cm lead is also provided with a connector on both ends for linking the windings.

On test the transformer was quiet and met the ratings given. It is claimed that this transformer meets AS C126. — VK3YFF.

IPSWICH RC 2M PREAMPLIFIER

"If I can get it going, **anybody** can". Well, I did, but reference to the relevant article in AR was a must. The instructions that came with the kit were poorly printed and vague, and the tinned copper wire provided to wind the coils was only enough for one coil.

Once mounted inside my deaf Pye 789, however, the story was quite different. Channel 40, dead a few moments before, was filled with stations and I found that my rig could now receive much better than it could transmit; reversal of the previous situation.

An A/B test on a recent trip to Ballarat showed that I could hear both 3RML and 3RWZ with the preamp, but not without.

A preamp will not necessarily improve a good rig, but if yours is a bit deaf, then I am sure that you would be pleased with the results of fitting one of these IRC units. — VK3YFF. ■

1976 SUBSCRIPTIONS REMINDER

No final notices will be sent out this year from the Executive Office.

All subscription notices already mailed carry the wording —

"FIRST AND FINAL NOTICE"

Please take note and arrange to pay your 1976 subscription at once if you have not already done so.

AR's will soon cease for unfinancials and missing copies cannot be supplied if your supply ceased because of being unfinancial.

PLEASE TAKE NOTICE.

CONTEST CHAMPION TROPHY

- **The specified first period for this trophy is the calendar year 1976 omitting the Ross Hull VHF UHF Memorial Contest 1976/77 on this occasion.**
- **Please refer to p.53 AR Dec. '75 for Contest Champion Trophy Rules.**
- **The qualifying contests will be:—**

John Moyle Memorial NFD	**— 1976**
Remembrance Day	**— 1976**
VK/ZL/Oceania DX-phone	**— 1976**
VK/ZL/Oceania DX-CW	**— 1976**

QSP

QSL CARDS

In a letter to the Editor in Radio Communication Sept. '75 Arthur Milne G2MI, the RSGB's QSL Manager for a great many years points up the high costs of printing QSL cards, the even worse postal charges and the time spent in the QSL Bureau which is wasted in sorting and storing cards never even collected. He said the RSGB QSL Bureau handles about 1½ million cards each year of which 600,000 are never claimed and have to be destroyed. We suggest the adoption of a "Never QSL" concept unless a card is requested or you want one or you receive one. A very commonsense idea. One day, for a small subscription, someone may come up with a computer bank for log sheets in place of QSL cards.

PAKISTAN

In the month of the Air column in Radio Communications Sept. '75 it was reported that G3NRQ recently spent several weeks in Pakistan and attended a meeting of the Pakistan ARS in Lahore. He was received with great courtesy but was unable to obtain operating permission. It seems that it can take residents 18 months to get a licence, and the severe import restrictions and high duty rates make equipment very scarce.

SCOUTS SUPPORT

The 25th World Scout Conference, comprising delegates from 86 countries unanimously voted to support amateur radio operators in their efforts to retain their present frequency allocations in the following terms — 1. to urge their Governments to resist any attempt to reduce the number and size of frequencies presently allocated to the Amateur Radio Service, and 2. to co-operate with the National Amateur Radio organisations in any actions designed to this end. IARU Region 1 News Sept. '75. ■

Around the Trade

WESTON ELECTRONICS — NEW 1976 LOCATION

Weston Electronics, a member company of Kemtron Ltd., has moved to Kingsgrove. The move is part of a program to centralise the operation of companies within the Kemtron Ltd. group. Enquiries and correspondence should now be directed to:—

Weston Electronics Company,
The Crescent,
KINGSGROVE, N.S.W. 2208

Phone (02) 50-0111 — Telex AA20061 — Cables: Westelec, Sydney. ■

ATTENTION FT101 OWNERS

At last a distortion free RF Clipper. Fits in minutes and really works. Only for FT101. Gives up to 6 times or more effective talk power **plus** extra RX selectivity and gain — not to be confused with audio type distortion producing clippers or compressors. Normal price £45 sterling, air post paid — introductory price $69 Australian direct from —

G3LLL HOLDINGS LTD.,
39/41 MINCING LANE, BLACKBURN BB2 2AF, ENGLAND

Hamads

- **Eight lines free to all WIA members. $9 per 3 cm for non-members.**
- **Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.**
- **Commercial advertising is excluded.**
- **Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.**
- **QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.**

FOR SALE

FT101B bought Feb. 75, hardly used, $500. VK3AXA, QTHR. Ph. (059) 42 7248.

Heathkit S.B. 400 TX, 80-10m upper and lower sideband, 2 x 6146B finals, 180W PEP power supply built-in, excellent condition $225. J. Lauten VK4VK, 6 Tosti St., Sorrento, 4217. Ph. (075) 31 6201 (Bus.), (075) 38 4162 (A.H.).

TS520 purchased new 4 months ago, immaculate condition. Set of Asahi Mobile Whips CW Bumper Mount, $585. Will consider separating — VK2AA. A.H. Newcastle 21101.

One Philips R5223 Communications Rx 1.5-30.5 MHz $200. Another modified with Collins 500 kHz SSB mechanical filter, $200. Both perfect condition and in current use. Rob Gurr, VK5RG QTHR. Ph. (08) 276 4547.

FTV650 Transverter as new, rarely used $150. Midland 27 MHz hand-held $25. Robot SSTV Monitor Model 70B, new in box $442. R. G. Gill, P.O. Box 299, Artarmon, N.S.W. 2064. Ph. (02) 412 4791.

Eddystone 888 Comm. Rx 160-10m amateur bands, complete with xtal calibrator and S meter, VGC $140. VK3AFE, Ph. (03) 772 1911. 53 Valetta St., Carrum, Vic. 3197.

HP45 Calc. incl. charger and applications book $150; Comm. Rx all valve, mech. filter, ham bands only, xtal locked front end, 3.5-4.0 IF Geloso Dial, prod. det. etc. $100; First year eng. drawing materials and text books over $200 worth — make an offer; small 3" CRO suit audio buff $50. VK3ZAZ QTHR. Ph. (053) 41 3777.

Icom IC60 solid state 6m 10W FM mobile similar to IC22, fitted with 52.525 & 52.656, complete with all cables, brackets, microphone & manual, $150. VK3ZRG, PO Box 134, Bendigo, 3550.

FT200 Transceiver and Power Supply (March '73), little used last 15 months, microphone and handbook, $350. VK4UR, QTHR. Ph. (07) 266 7873 A.H.

Comm. Rx realistic DX160 with external speaker, current model, 5 bands 150 Hz-30 MHz, excellent condition, $140 O.N.O. Katsumi mic. compressor MC22S, "The Poor Man's Linear", good condition, $20. B. Bathols VK3UV, QTHR. Ph. (03) 90 6424 evenings only.

Swan 500, good order, new 6HF5 finals, complete with AC supply, speaker and manual, $200. Yaesu FT200, excellent order, 6Gm6 RF tube fitted, good on 10m, complete with AC supply and manual, $300. VK3ALM, QTHR. Ph. (053) 39 1703.

One Barker & Williamson RF Coaxial Antenna Switch, brand new, unused, model 550A, single pole, 5 positions 1 kW AM, $22. VK4WR, 6 Olive Court, Nambour, 4560.

Aluminium Mast Sections, 2 only, 20 ft. long, 2 in. diameter, virtually "as new" condition, $18 each (less than half replacement cost). Buyer must arrange collection. VK5WD, QTHR. Ph. (08) 380 6093.

A good home required for a clean 400W PEP linear amp., uses pair parallel 4CX-350As in AB1. All power needs are internal, all you need is a 6m 5W PEP exciter and an antenna; have shifted QTH to dense ch. 0 viewing area, unit is going to waste, excellent performer, unlimited potential. Will deliver and install FOC VK1, VK2, VK3, VK5, 2 spare tubes. Offers? 20 Landale Ave., Mt. Clear, 3350.

Barlow Wadley Rx XCR30, Mark II, brand new in carton, $225. VK2BLB Bill (02) 84 2405 A.H.; (02) 270 4232 Bus.

FTDX560, same as FTDX401 but more power, very little use, mint condition, $400. Galaxy Power Meter, $50. Mic. high quality, $15, or the lot for $450, you freight. VK2RM, QTHR. Ph. (047) 58 6569 after 6 p.m.

Silent Keys

It is with deep regret that we record the passing of—

Mr. W. H. WILLCOXSON	**L20717**
Mr. R. F. DRUMMOND	**VK2BRD**
Mr. W. L. PEARN	**VK5PN**
Mr. N. U. CURLEWIS	**VK2ALI**
Mr. H. O. WANKE	**VK6XO**

George S. Samways VK3OG (G6OH), known by all his friends as Sam, passed away suddenly on 25th November from an unexpected heart attack. Sam was active on the HF bands for over fifty years in England and Australia, and will be sadly missed by all who knew him.

20m SSB Transceivers, less mike and PS, sell for replacement cost of valves and parts only, 1000V 1a transformers, $8. 813s 811As, assorted transmitting tubes, cheap. VK2TG, QTHR. Ph. (02) 533 2895.

WANTED

Transverters — 6m, 2m, 70cm, to suit FT101, also helical or trap verticals anywhere in between 160m to 6m. Bob Yorston, VK2CAN. Ph. (02) 646 0 (9-5).

FV50, FV50B, VFO Matching Speaker for FRSC 5-25 Henry Swinging Choke, 20 Henry Choke 400 MA ratings. VK3ZAZ QTHR. Ph. (05) 41 3777.

SB-220 Linear Amplifier — correspondence to G.P.O. Box 3209, Sydney, 2001 or Ph. (02) 92 4698.

8236 Carbon Anode final tube, prefer unused. C. E. Schmidt VK5WG QTHR.

SERVICE

Anyone wanting computer print-out for Oscar 6 and 7 for each days orbits, send S.A. Jiffy bag or envelope (large) to VK3ZAZ R.S.D. Buninyong, Vic. 3357 or phone (053) 41 3777.

FEBRUARY 1976
VOL. 44, No. 2

VHF FM FROM THE WORLD LEADERS – YAESU

FT-224

● 24 CHANNEL FM TRANSCEIVER

The FT-224 is an advanced, solid state transceiver, that features 10 watts and 23 channel flexibility plus one priority channel, all in one compact package. Dial is marked in channel frequencies for direct read-out, and three popular channels are installed. Additional plus features include automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. A monitor switch is provided which enables checking of your own transmitter/receiver frequencies. Panel meter functions as "S" meter, transmitter RF output, and centre reading discriminator meter which enables received frequency to be checked. FET RF with five section helical resonator. Three IF filters. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.

GENERAL

Frequency Range: 146 to 148 MHz.
Number of Channels: 23 plus 1 priority channel.
Mode: FM.
Frequency Stability: ±0.001%.
Circuitry: 30 Transistors, 23 Diodes, 4 IC, 5 FET.
Power Source: 13.5V DC.
Antenna Impedance: 52 ohm unbalanced.
Power requirement: 0.4A receive, 2.2A transmit (DC).
Size: 180(w) x 70(h) x 220(d) mm.
Weight: 2.5 kg.

RECEIVER

Sensitivity: 0.3 uV for 20 dB quieting.
Selectivity: 15 kHz at 6 dB, 25 kHz at 60 dB.
Audio Output: 2.5 Watts at 4 ohm.

TRANSMITTER

RF Output Power: 1 & 10 watts.
Spurious Radiation: —60 dB or better.
Deviation: ±5 kHz nominal.

FT-224	**$218.00**
Extra standard channels	**$8.00**
FP-2 Matching AC PS	**$69.00**

Sigmasizer-200R

● 200 CHANNEL SYNTHESIZED TRANSCEIVER

YAESU now offers the FM enthusiast a complete, solid-state, 200 channel 2 metre FM transceiver. The Sigmasizer-200R features advanced, synthesized circuitry for total repeater and simplex coverage of the 146 to 148 MHz FM band. Frequencies are selectable in 10 kHz increments and front panel selectable 600 kHz transmitter offset oscillators give complete flexibility for repeater operation.

GENERAL

Frequency Range: 146 to 148 MHz.
Number of Channels: 200 (10 kHz intervals) Simplex and 600 kHz Tx offset for Repeater operation.
Power Source: 13.8V DC (negative ground).
Power requirement: 0.45A receive, 2.2A transmit.
Size: 220(w) x 80(h) x 230(d) mm.
Weight: 3 kg.

RF Output Power: 1 or 10 Watts.
Spurious Radiation: —60 dB minimum.
Deviation: ±5 kHz nominal.
Sensitivity: 0.3 uV for 20 dB quieting.
Selectivity: ±8 kHz at 6 dB, ±16 kHz at 60 dB.
Audio Output: 2 watts at 4 ohm.

PRICE: $390.00

Prices include Sales Tax. Freight and insurance extra. Prices and specifications are subject to change. All sets are pre-checked before dispatch and are covered by our 90 Day Warranty.

We have now received a large quantity of the latest **YAESU** five colour catalogue, with all data in English language. It is printed in Japan and certain conditions and specifications may vary for Australia, refer our advertisements. This is a beautifully produced and valuable publication. Send 40 cents PP for your copy by return mail.